

BOTANICAL ABSTRACTS

A monthly serial furnishing abstracts and citations of publications in the international field of botany in its broadest sense.

UNDER THE DIRECTION OF

THE BOARD OF CONTROL OF BOTANICAL ABSTRACTS, INC.

BURTON E. LIVINGSTON, Editor-in-Chief
The Johns Hopkins University, Baltimore, Maryland

Vol. II

MAY, 1919

No. 3

ENTRIES 371-639

ECOLOGY AND PLANT GEOGRAPHY

H. C. COWLES, *Editor*

371. CONNER, S. D. Soil acidity as affected by moisture conditions of the soil. Jour. Agric. Res. 15: 321-330. Nov., 1918.—The effect of one-fourth, one-half and full saturation of the soil with water, on the acidity determined by potassium-nitrate and calcium acetate methods. Results show measurable difference in acidity due to different moisture conditions. This paper not primarily ecological but is of value in connection with the distribution of plants on wet or acid soil.—H. L. Shantz.

372. DIELS, L. Das Verhältnis von Rhythmik und Verbreitung bei den Perennien des europäischen Sommerwaldes. [The relation between periodicity and geographic distribution in perennials of European forests.] Ber. Deutsch. Bot. Ges. 36: 337-351. 5 fig. Oct., 1918. Author potted various herbaceous perennials in autumn, transferred them to cool but frost-free glass-houses, and set them in the open in the summer, carrying the experiment over two years. The species exhibited three types of behavior in response to the changed environment. 1. The *Asperula* type includes plants which remain continuously in vegetative activity. The species are chiefly southern in range and belong to prevaillingly tropical families. Their usual winter rest is not rhythmic but is a direct result of cold. 2. The *Leucocorym* type includes plants which begin their activity in autumn, finish it in spring, and have a summer resting period. They are chiefly of Mediterranean origin, and, while normally rhythmic in their activity, the actual time of the resting period is determined by the environment. 3. The *Polygonatum* type continues to rest during the winter even in the greenhouse, and merely resumes activity earlier in the spring than would occur out of doors. The species are chiefly hibernetic in distribution, belonging to extra-tropical families, and their periodicity is in direct correlation with the seasons. Author infers that other types of behavior may also occur.—H. A. Gleason.

373. GUPPY, H. B. Plant distribution from the standpoint of an idealist. Jour. Bot. 56: 112-113. Apr., 1918.—An appeal is made for cooperation between the supporters of Darwin and DeVries, it being argued that in Mesozoic times mutation was probably the more important mode of evolution, whereas other modes of evolution may now be more important. With the greater mutability in older times we may associate the rise of the great families of angiosperms, while in the more modern times adaptivity has taken a larger place, and with this we may associate the differentiation into species. Families in their distribution largely share the cleavage of the lands into two great masses, and thus point back to an epoch of pre-differentiation. The cleavage between the continents, however, is shown in genera and

even more in species, being connected with the more modern epoch of differentiation. The Dicotyledons show greater detachment from the tropics than do Monocotyledons, the Symptetales standing foremost in regard to such detachment.—H. C. Cowles.

374. HARVEY, R. B. **Hardening process in plants and developments from frost injury.** Jour. Agric. Res. 15: 83-112. 6 pl., 3 fig. Oct., 1918.—A review of the literature and a discussion of frost injury. Frost is first indicated in succulent leaves such as cabbage by the withdrawal of water from cells and the displacement of the air in intercellular spaces. From cells of cabbage, *Bryophyllum*, *Salvin* and lettuce show growth stimulus and produce tumors, while tomato, *Coleus* and geranium tissues are killed. In cabbage peroxidase and hydrogen-ion concentration are more pronounced in frozen than in normal cells. Exposure of cabbage to a temperature of $+3^{\circ}\text{C}$. for five days hardened the plants to such an extent that they were not frozen when subjected to -3°C . for over half an hour. This hardening is due to some changes in the protoplasm, such as increase in hydrogen-ion concentration and salt content which prevent the precipitation of the protoplasm. The carbohydrate changes accompanying hardening were slight.—The effect of desiccation, freezing and plasmolysis are considered to be similar. [See Bot. Absts. 2, Entry 120.]—H. L. Shantz.

375. JENNINGS, O. E. **Notes on the mosses of northwestern Ontario. I. Sphagnum.** Bryologist 21: 69-78. Pl. 27, 1 map. 1918.—The first of a series of papers relating to the bryophytes of the northernmost section of the "North Shore" of Lake Superior and a large area of the contiguous interior. Twelve species of *Sphagnum* are recorded, together with ecological notes regarding geographic range, local occurrence, and observed ecological relations. [See Bot. Absts. 1, Entry 1418.]—G. E. Nichols.

376. MACCAUGHEY, VAUGHAN. **A survey of Hawaiian coral reefs.** Amer. Nat. 52: 437-438. 9 fig. June-July, 1918.—There is included in this report a brief consideration of the zonal distribution of the principal marine algae associated with the coral reefs. Species of green, brown and red algae are included, the last being most abundant.—Geo. D. Fuller.

377. MACCAUGHEY, VAUGHAN. **An ecological survey of the Hawaiian pteridophytes.** Jour. Ecol. 6: 199-219. Nov., 1918.—The Hawaiian Islands have 44 genera and 190 recorded species of pteridophytes of which two genera, *Dicella* and *Sadleria*, and 125 species are endemic; 33 species are cosmopolitan, 20 center in the South Pacific and 6 have their chief distribution in America. In the distribution of these plants upon the different islands of the group the author finds evidence in support of the hypothesis that the westward islands are older and have been longer isolated than the eastern. The different species are classified according to the ecological zone in which they occur, their altitudinal ranges are given and the more decidedly hygrophytic, mesophytic and xerophytic forms are grouped. An annotated list of species and a bibliography complete the article.—Geo. D. Fuller.

378. POLLOCK, JAMES B. **Blue-green algae as agents in the deposition of marl in Michigan lakes.** Michigan Acad. Sci. 20: 247-260. Pl. 16-17. 1918.—See Bot. Absts. 2, Entries 622-623.

379. SKOTTSBERG, CARL. **Genom Canadas växtgeografiska provinser. [Through Canada's phytogeographic provinces.]** Fauna och Flora 1918: 1-21. 11 fig. 1918.—This paper presents the impressions gained by the author in a transcontinental trip through Canada. The species are rather fully cited. Among the places visited were forests and flood plains near Ottawa, Stony Mountain at Winnipeg, the Rockies at Banff, Lake Louise, the Kicking Horse River, the Illecillewaet Glacier, and Albert Canyon.—A. L. Bakke, H. C. Cowles.

380. WATSON, W. **Sphagna, their habitats, adaptations, and associates.** Ann. Bot. 22: 535-551. 5 fig. Oct., 1918.—This paper is primarily an attempt to demonstrate a correlation between the morphological and ecological characters of the sphagnum. The sphagnum

possess various structural peculiarities which may seem to be of a xerophytic nature. The characters specified as such are compactness of habit, imbrications of leaves, concave leaves with hooded or inrolled apical portions, formation of capillary chambers along which water passes, papillosity of the cell wall, intermixture of dead empty cells with living chlorophyllous ones, and presence of reservoirs that serve to store water. These peculiarities are variously developed in different groups of sphagnum, but an attempt to make a comparative correlation between the structure of different plants and the wetness of their habitats leads to inconsistencies and anomalies. Other factors than the degree of wetness influence the distribution of the sphagnums, and the most important of these is the acidity of the water with which they are in contact. The sphagnums obtain their mineral salts from very dilute solutions. They apparently possess a special method of mineral nutrition by which the base of a salt is absorbed and the acid liberated. Various of the apparently xerophytic structural devices are thought to be correlated primarily with this peculiar method of nutrition. During periods of drought, when absorption by exposed plants is suspended, the xerophytic devices act as such, keeping the plant in a moist condition until a further supply of dilute solution is available. [See Bot. Absts. 2, Entry 334.]—G. E. Nichols.

FOREST BOTANY AND FORESTRY

RAPHAEL ZON, Editor

381. HILTON, HUBER C. Furrow planting upon the sand plains of Michigan. *Jour. Forestry* 16: 915-919. December, 1918.—Furrow planting under ordinary weather conditions has been a success with Norway pine 2-0 and 2-1 stock at a cost of from \$2.00 to \$2.40 an acre. Survivals of from 87 to 96 per cent are secured, as even under unfavorable weather conditions the trees, being below the level of the surrounding soil cover, can better withstand a period of drought. The furrows also serve as fire guards and can remain unplanted for two years, as no vegetation comes in during that time and there is no erosion.—E. N. Munna.

382. PEARSON, G. A. The relation between spring precipitation and height growth of western yellow pine saplings in Arizona. *Jour. Forestry* 16: 677-689. 3 figs. Oct., 1918. Western yellow pine in northern Arizona makes its height growth during the period of lowest precipitation in the year. During this period of great activity the trees are dependent almost entirely upon moisture stored in the soil since the preceding winter and spring. Normally the great bulk, and in some years all, of this moisture is accumulated during the winter months, December-March. When winter precipitation constitutes the sole supply, height growth in young saplings is apt to be small. If winter precipitation is supplemented by 2 inches or more in April and May (the rainfall in June is rarely sufficient to be of any consequence), a pronounced stimulus to height growth results. It may be stated as a general rule for the sites covered by this study, that 2 inches or more of precipitation between April 1 and May 31 is several times as effective as the same amount in excess of the normal precipitation between December 1 and March 31. Factors reflecting atmospheric conditions between April 1 and June 30, including evaporation, wind movement, relative humidity, cloudiness, and length of rainless period, show a close, though not entirely consistent, relation to height growth. Temperature on the sites studied appears to be important only in so far as it affects moisture conditions. Since rise in temperature results in increased water consumption, height growth varies inversely with temperature when, as is usually the case, there is a shortage of moisture. Observations indicate that where moisture is abundant, height growth increases directly with higher temperature.—G. A. Pearson.

383. LINN, EDWARD R. Silvical systems in spruce in northern New Hampshire. *Jour. Forestry* 16: 897-903. December, 1918.—Conditions in old cuttings in the hardwood type, spruce-slope type and spruce-flat type are described, where the cuttings were made by different methods of the diameter limit and clean cutting. The defects of the rigid diameter limit and how to secure reproduction are discussed, and it appears that clean cutting, if carefully done, may lead to better reproduction than is commonly supposed.—E. N. Munna.

384. SINGH, PURAN. A note on the economic value of the Chinese tallow tree (*Sapium sebiferum*). *Indian Forester* 44: 383-388. Sept., 1918. The tallow tree may become an important source of vegetable tallow and drying oil. These products should be manufactured with the aid of solvent extraction, for the yield by the steaming process is 50 per cent less than by the solvent method. There is a very small amount of dye-principle in the leaves but not enough to warrant extraction. Due to the presence of ammonia, the leaves should be a valuable fertilizer.—E. N. Munns.

GENETICS

GEORGE H. SHULL, *Editor*

385. ANONYMOUS. A cross between a raspberry and a dewberry. *Jour. Heredity* 9. Frontispiece. 1 fig. Dec., 1918. Illustration of hybrid from *Rubus rubioides* (dewberry) ♀ × *R. strigosus* (red raspberry) ♂, made by H. Ness, Texas Agric. Exp. Sta. F₁ gave 26 uniform plants but only 5 fully fertile. 1000 F₂ plants appear uniform and similar to parents. Fruit is dark red to nearly black. Flavor suggests raspberry, very superior to blackberry.—Merle C. Coulter.

386. BANTA, ARTHUR M. The extent of the occurrence of sex intergrades in Cladocera. *Anat. Rec.* 15: 355-356. Jan. 20, 1919. [Author's abstract of paper read before American Society of Zoologists at Baltimore, December 27, 1918.] Sex intergrade strains of *Simocephalus retulus* have been reared in the laboratory for three years (65 generations). They all came from the offspring of a single individual. Notwithstanding careful microscopic examination of thousands of individuals of all the laboratory strains (15) of this species, particularly during the last twenty months, no other sex intergrades have been found either in the strain which produced them originally or in any of the other strains of *Simocephalus*. About twenty months ago sex intergrades were found in one of the strains of *Daphnia longispina* and from these we have propagated sex intergrade strains for some 36 generations. During the next few months sex intergrades were found (sparingly and only after the microscopic examination of thousands of individuals) in all except one of the six strains of the species under cultivation. Sex intergrade strains derived from three distinct strains of the species are being propagated. Two or three sex intergrades were also seen in a strain of the species in 1915 but no young were secured from them.—Long and continued search of great numbers of individuals of 18 strains of *Daphnia pulex*, 7 strains of *Simocephalus serrulatus*, and of 11 strains of three species of *Moina* has not revealed a single sex-intergrade individual. Hence in these species as well as in *Simocephalus retulus* the occurrence of sex intergrades is apparently a rare phenomenon. Sex intergrades are relatively rare in *Daphnia longispina* as well, although laborious search has revealed them, mostly a single individual to a strain of five or six strains. Once established, however, intergrade strains continue indefinitely the production of sex intergrades.—In the literature there is, presumably, only a single mention of the finding of sex intergrades (R. de La Vaulx). In view of the large number of workers with Cladocera and the extensive experimental work on this material the fact that there has been apparently only a single occurrence of sex intergrades in other laboratories speaks further for the restricted occurrence of these interesting sex forms.—A. M. Banta.

387. BAUR, E. Rev. of: H. W. SIEMENS. Biologische Terminologie und rassenhygienische Propaganda. (Biological terminology and eugenical propaganda.) *Arch. Rass. Ges. Biol.* 1917: 257. 1917. *Zeitschr. Abstamm. Vererb.* 19: 311-312. Aug., 1918.—Siemens has proposed a logical nomenclature to supplant the more or less confused terminology which has grown up in genetical literature. Reviewer thinks that owing to shifting conceptions it is better to retain the present terminology with shifting significance of terms. He especially objects to substitution of "idiophor" for "gene."—G. H. Shull.

388. BAUR, E. [Rev. of: H. W. SIEMENS. Die biologischen Grundlagen der Rassenhygiene und der Bevölkerungspolitik. (The biological principles of race hygiene and of eugen-

(policy.) 800, 80 p., 8 fig. J. F. Lehmann: München. 1917.] Zeitschr. Abstamm. Vererb. 19: 312. Aug., 1918.—Reviewer considers this popular presentation important in view of lack of biological training among physicians, sociologists and social workers. Author uses his new terminology. [See next preceding Entry, 387.] but gives also synonymy with current terminology. All technical expressions are, throughout, very well "verdeutschet."—Geo H. Skull.

389. BAUR, E. [Rev. of: ZADE, A. Der Hafer. Eine Monographie auf wissenschaftlicher und praktischer Grundlage. (Oats. A monograph on scientific and practical principles.) 800, 65 p., 52 fig. Fischer: Jena, 1918. (See Bot. Absts. 2, Entry 467.)] Zeitschr. Abstamm. Vererb. 20: 52-53. Sept., 1918.

390. BROTHERTON, W. E. Note on inheritance in *Phaseolus*. Ann. Rept. Michigan Acad. Sci. 20: (1918): 152. 1919.

391. CASTLE, W. E. Is the arrangement of the genes in the chromosome linear? Proc. National Acad. Sci. U. S. Amer. 5: 25-32. 2 fig., 1 diagram. Feb., 1919. See Bot. Absts. 2, Entry 658.

392. CASTLE, W. E. The linkage system of eight sex-linked characters of *Drosophila virilis* (data of Metz). Proc. National Acad. Sci. U. S. Amer. 5: 32-36. Fig. 5 4. Feb., 1919. See Bot. Absts. 2, Entry 659.

393. COBB, FRIEDA. A case of Mendelian segregation in *Oenothera pratincola*. Ann. Rept. Michigan Acad. Sci. 20 (1918): 151. 1919.

394. COLE, L. J. A laboratory manual for genetics. [Rev. of: BARCOCK, E. B., and J. L. COLLINS. Genetics laboratory manual. First edition. xi + 68 p. McGraw-Hill Book Co. Inc.: New York, 1918.] Jour. Heredity 10: 39-40. Jan., 1919.

395. COULTER, JOHN M., and MERLE C. COULTER. Plant genetics. 19 x 13 cm., ix + 214 p., 30 fig. Univ. Chicago Press: Chicago. July, 1918.—Authors state book is neither technical presentation of genetics nor general text, but course of general lectures adapted to initiate young botanists into point of view of working geneticists. Discusses theories of Darwin, Weismann, and deVries; inheritance of acquired characters; Mendel's laws; "neo-Mendelism," including presence and absence hypothesis, factor hypothesis, blends, inheritance of quantitative characters, practical aspect of cumulative factor hypothesis, linkage and crossing-over. So-called non-Mendelian inheritance and somatic segregation are also considered. Experiments of Castle and Jennings are cited in reference to modification of unit characters. Briefly considers investigations of sex phenomena in algae, fungi, liver-worts, mosses and seed plants, as well as physiological and chromosome theories of sex determination; evidence from cytology and breeding for and against chromosomes as bearers of hereditary factors. Parthenogenesis and vegetative apogamy are considered in regard to bearing on genetical experiments. Points out advantages of lower plants as material for genetical experiments because (1) in them reproductive phenomena are not obscured by so many complexities; (2) would test theories of inheritance derived from study of sporophyte involving theoretical mechanism for segregation of factors. Chapters on self sterility and endosperm in inheritance. Favors view that semi-sterility may be due to Mendelian factor. [See Bot. Absts. 1, Entry 1471.]—E. E. Barker.

396. COULTER, JOHN M. Embryo sac and fertilization in *Oenothera*. [Rev. of: ISHIKAWA, M. Studies on the embryo sac and fertilization in *Oenothera*. Ann. Bot. 32: 279-317. 1918. See Bot. Absts. 1, Entries 482, 979, 980.] Bot. Gaz. 67: 275-276. Mar., 1919.

397. COULTER, MERLE C. Breeding for disease resistance. [Rev. of: (1) EVANS, I. B. P. South African cereal rusts with observations on the problem of breeding rust resistant wheats. Jour. Agric. Sci. 4: 95-104. 1911. (2) STAKMAN, E. C., JOHN H. PARKER, and F. J. PIEMEISEL.

Can biologic forms of stem rust on wheat change rapidly enough to interfere with breeding for rust resistance? Jour. Agric. Res. 14: 111-123. Pl. 13-17. 1918. (See Bot. Abstr. 1, Entry 500.) Bot. Gaz. 67: 273. Mar., 1919.

398. DE VRIES, HUGO. *Oenothera rubrinervis*, a half mutant. Bot. Gaz. 67: 1-26. Jan., 1919. *Oenothera rubrinervis* (a "half mutant" from *Oe. Lamarckiana*, produced by combination of mutated gamete with normal *velutina* gamete) when self-fertilized produces in every generation about one-fourth empty seeds, "mass mutation" of about one-fourth double mutants (*O. deserens*, which breeds true and produces no empty seeds), and one-half *O. rubrinervis*, which repeats splitting. Author concludes *deserens* is repetition of initial mutation, which produced *rubrinervis* from *Lamarckiana*. According to author's view *Lamarckiana* produces two kinds of gametes, in consequence of secondary mutability into *velutina*, the *velutina* being linked to lethal factor which kills it in young seeds. Assuming that mutation into *deserens* occurred in typical gametes, leaving *velutina* unchanged, *rubrinervis*, like *Lamarckiana*, must have two types of gametes, both of them in a mutated condition—*deserens* without a lethal factor, and *velutina* with one. In self-fertilization of *rubrinervis*, copulations of *deserens* gametes among themselves produce *deserens*, *velutina* among themselves give empty seeds, and combinations of the two types of gametes give *rubrinervis* with its splitting capacity. Proof of above conception is given by results of self-fertilizations and crosses. *Oe. oblonga* is mutation analogous to *rubrinervis*, arising through mutation of normal *Lamarckiana* gametes, leaving *velutina* gametes unchanged, but mutated gametes must be assumed to be suppressed in its pollen. *Oe. nanella* seems to arise through mutations in *velutina* gametes of *Lamarckiana*. [See Bot. Abstr. 1, Entry 1478.]—Frieda Cobb.

399. ELLINGER, TAGE. [Rev. of: JENNINGS, H. S. The numerical results of diverse systems of breeding. Genetics 1: 53-89. 1916. Zeitschr. Abstamm. Vererb. 19: 205. June, 1918.]

400. FEDERLEY, HARRY. [Rev. of: (1) METZ, CHARLES W. Chromosome studies on the Diptera. 2. The paired association of chromosomes in the Diptera and its significance. Jour. Exp. Zool. 21: 280. 8 pl. 1916. (2) IDEM. [Same general title.] 3. Additional types of chromosome groups in the Drosophilidae. Amer. Nat. 50: 587-599. 1 pl. 1916.] Zeitschr. Abstamm. Vererb. 19: 211-213. June, 1918.]

401. FEDERLEY, HARRY. [Rev. of: PUNNETT, REGINALD CRUNDALL. Mimicry in butterflies. 188 p., 16 pl. Cambridge Univ. Press: Cambridge, England, 1915.] Zeitschr. Abstamm. Vererb. 19: 213-215. June, 1918.]

402. FRANZ, V. [Rev. of: HAECKER, VALENTIN. Über eine entwicklungsgeschichtlich begründete Vererbungsregel. (On a law of inheritance based on embryology.) Mitteil. Naturforsch. Ges. 4. 1916.] Arch. Rassen- u. Gesellschaftsbiol. 13: 93-95. 1918.]

403. FRANZ, V. [Rev. of: HAECKER, VALENTIN. Zur Eigenschaftsanalyse der Wirbeltierzeichnung. (Analysis of the distinctive color markings of vertebrates.) Biol. Zentralbl. 36: 448-471. 1916.] Arch. Rassen- u. Gesellschaftsbiol. 13: 93-95. 1918.]

404. FREUDENBERG, RICHARD. [Rev. of: ROEMER, TH. Über die Befruchtungsverhältnisse verschiedener Formen des Gartenkohles (Brassica oleracea L.) (On the fertilization relationship of different forms of garden cabbage—*Brassica oleracea* L.) Zeitschr. Pflanzenzücht. 4: 125-141.] Zeitschr. Abstamm. Vererb. 19: 222-223. June, 1918.]

405. GHIGI, ALESSANDRO. Ricerche sull' incrociamento del Gallus sonnerati con pollidomesticci. Mem. R. Acc. Bologna 8¹¹: 1-16. 1 pl. Abstract from Ibis 1: 134. Jan., 1919.—"In this memoir Professor Ghigi states the results of his experiments in crossing the two species of Jungle-Fowl *Gallus sonnerati* and *G. gallus* and also various members of the domestic

the races. All of these he finds completely fertile with one another through several generations. From this he deduces the conclusion that our domestic races are not, as has been believed by Charles Darwin and many other writers, monogenetic and descended solely from *Gallus gallus* (= *G. bankiva* auct.), but that they are bigenetic and have been derived from both *G. gallus* and *G. sonnerati*.—Details of the hybrids and of their Mendelian inheritance are given, and the plate illustrates the feather-characters of the pure strains and of the various crosses."

406. GOEDEWAAGEN, M. A. J. [Rev. of: F. BACO. Variations d'un hybride sexuel de vigne par sa greffe sur l'un de ses procréateurs. (Variations of a sexual hybrid of the grape, when grafted onto one of its parents.) Compt. Rend. Acad. Sci. Paris 163: 712-714. Jan., 1910.] *Genetica* 1: 98. Jan., 1919.

407. GOEDEWAAGEN, M. A. J. [Rev. of: L. DANIEL. Influence de la greffe sur les produits d'adaptation des Cactées. (Influence of grafting on the adaptive products of the Cactaceae.) Compt. Rend. Acad. Sci. Paris 164: 318-323. 1917.] *Genetica* 1: 106. Jan., 1919.

408. GRAEVENITZ, V. [Rev. of: KAJANUS. Zur Genetik der Samen von *Phaseolus vulgaris*. (Genetics of the seed of *Phaseolus vulgaris*.) Zeitschr. Pflanzenzücht. 2: 378-388. 1913.] *Zeitschr. Abstamm. Vererb.* 20: 60. Sept., 1918.

409. GRAEVENITZ, V. [Rev. of: FROST, HOWARD B. The inheritance of doubleness in *Matthiola* and *Petunia* I. The hypothesis. Amer. Nat. 49: 623-635. 1915.] *Zeitschr. Abstamm. Vererb.* 20: 56-57. Sept., 1918.

410. HANCE, ROBERT T. Variations in the number of somatic chromosomes in *Oenothera scintillans* de Vries. *Genetics* 3: 225-275. 5 fig., 7 pl. May, 1918. Somatic cells contain from 15 to 21 chromosomes, the higher numbers resulting chiefly from fragmentation of some of larger of the 15 fundamental chromosomes of the species. Special methods of measurement were developed which showed typically series of 7 pairs and one unpaired chromosome. A member of a pair differs from one of next shorter pair by about 9 per cent of its length. Fragments were smaller than unpaired chromosome which is shortest of the 15 chromosomes in the fundamental group and it was possible to associate fragments with the chromosomes from which they were derived. The sum of length of chromosomes is same whether number be 15 or more. Fragmentation was not observed in cells of germinal line. Two classes of gametes are developed possessing respectively 7 and 8 chromosomes, the unpaired chromosome passing to one of the poles at reduction division. Same relative length relations exist between chromosomes of haploid group as between pairs of diploid group. Total chromosome length in the 8-chromosome gametes differs from that of 7-chromosome gamete by length of the additional unpaired chromosome. Characters of *Oe. scintillans* are associated with the unpaired chromosome since union of two 7-chromosome gametes gives *Lamarckiana* with 14 chromosomes. A type resembling *oblonga* is thrown by *scintillans* in addition to *Lamarckiana* and it is suggested that this plant may be result of union of two 8-chromosome gametes, giving zygote with 16 chromosomes.—B. M. Davis.

411. HERIBERT-NILSSON, NILS. Experimentelle Studien über Variabilität, Spaltung, Artbildung und Evolution in der Gattung *Salix*. [Experimental studies on variability, segregation, speciation and evolution in the genus *Salix*. Lunds Universitets Årsskrift. N. F. (Afd. 2. 14 (No. 28): 1-145. 65 fig. 1918.

412. HERIBERT-NILSSON, N. [Rev. of: KLEBAHN, H. Formen, Mutationen und Kreuzungen bei einigen *Oenotheren* aus der Lüneburg Heide. (Forms, mutations and crosses in several *Oenotheras* from the Lüneburg heath.) Jahr. Hamburg Wiss. Anstalt 31: 1-64. 11 pl. 1913.] *Zeitschr. Abstamm. Vererb.* 20: 46-48. Sept., 1918.

413. HERIBERT-NILSSON, N. [Rev. of: NILSSON-EHLE, H. Hveteförädlingen för Svealand. (Wheat improvement for Svealand.) Sveriges Utsädesfören. Tidskr. 26: 5-23. 1916.] *Zeitschr. Abstamm. Vererb.* 20: 50. Sept., 1918.

414. HOLMES, S. J., AND C. M. DOUD. The approaching extinction of the Mayflower descendants. *Jour. Heredity* 9: 296-300, 335. Nov., 1918.—Review of biographical study of Mayflower families and of special study made by the California branch of the Society of Mayflower Descendants. Study shows steady decline in size of Mayflower families. Genealogy of the Brewster family is analyzed. Decline in family size has been especially rapid during last fifty years. Suggested that Society of Mayflower Descendants consider means of conserving their stock. [See Bot. Absts. 1, Entry 1511.]-H. H. Laughlin.

415. HYDE, ROSCOE R. Correlation of fertility and fecundity in an inbred stock. *Anat. Rec.* 15: 355. Jan. 20, 1919. [Author's abstract of paper read before American Society of Zoologists at Baltimore, December 27, 1918.]-Over 95 per cent of the eggs isolated from a mating of the wild *Drosophila ampelophila* gave rise to mature flies. On inbreeding the fertility rapidly declined. The fecundity of the female was not affected in this way. The correlation between the number of eggs which a female lays and the percentage which gave rise to mature flies is very low. This would seem to indicate that the sterility as it affects the female bears no causal relation to reduced fertility.-R. R. Hyde.

416. ISHIKAWA, M. Studies on the embryo sac and fertilization in *Oenothera*. *Ann. Bot.* 32: 279-317. April, 1918.—See Bot. Absts. 1, Entries 482, 979, 980. [Rev. in Bot. Gaz. 67: 275, 276. Mar., 1919.]

417. ISSERLIS, L. On a formula for the product-moment coefficient of any order of a normal frequency distribution in any number of variables. *Biometrika* 12: 134-139. Nov., 1918.—For a frequency distribution involving two variables, reduced product moment is correlation coefficient. Present author proves in *Biometrika* 12, Part III that in case of a normal distribution in four variables, the product moment is sum of products of correlation coefficients two at a time. Present paper generalizes this result for any even number of variables: reduced product moment is sum of products of correlation coefficients, each term involving all variables. As important special cases, values of mixed moment coefficients of any order in each variable can be deduced.-R. B. Robbins.

418. ISSERLIS, L. Formulae for determining the mean values of products of deviation of mixed moment coefficients in two to eight variables in samples taken from a limited population. *Biometrika* 12: 183-184. Nov., 1918.—Gives formulae for expected deviation of product moments in many samples of given size from mean of product moments, in terms of the observed product moments, total number of individuals and number in samples. [See Bot. Absts. 1, Entry 1515.]-R. B. Robbins.

419. LENZ, F. [Rev. of: FEDERLEY, HARRY. Die Vererbung des Raupendimorphismus von *Chaerocampa elpenor* L. (The inheritance of the pupal dimorphism of *Chaerocampa elpenor* L.) Öfversigt af Finska Vetenskaps-Soc. Förhandl. 58: 13. 1915-16.] *Zeitschr. Abst.-um. Vererb.* 19: 215-216. June, 1918.

420. LOVE, H. H., AND G. P. McROSTIE. The inheritance of hulllessness in oat hybrids. *Amer. Nat.* 53: 5-32. 7 fig. Jan.-Feb., 1919.—Crosses between hullless oats (*Avena nuda*) and hulled varieties were studied. Hullless forms differ from hulled in three important characters: 1. Kernel is loose or free within hull; 2. Rachillae of three- to many-grained spikelet are so elongated that uppermost grains are borne above the empty glumes; 3. Glumes and lemmas are similar in texture.—F₁ types were intermediate in that both types of kernels hulled and hullless, are formed on same plant. Type of panicle resembles hullless parent more than hulled. There are, however, fewer hulled than hullless kernels on F₁ panicles.—Although F₂ ratios deviate from 3:1 they indicate that this character behaves as simple monohybrid. In F₁ pure hulled and hullless plants bred true, while intermediate types gave approximately 1 hulled: 2 intermediate: 1 hullless. Percentage of hulled kernels on heterozygous F₂ plants varied from about 3 to more than 90. Thus, while the usual 1:2:1 ratio obtained, some factor

or factors seemed to affect heterozygous forms so as to modify amount of hulled or hullless kernels present. Some of the work was therefore continued (beyond F_1) in attempt to answer in general two questions: 1. Does percentage of hulled plants obtained from any heterozygous parent vary with percentage of hulled kernels possessed by that parent? 2. Do hulled and hullless kernels of heterozygous plant give approximately same results in their offspring? Some families did not give ratios close to 1:2:1, and those plants having high percentage of hullless kernels tended to produce relatively high number of hullless plants. Thus degree of hulllessness as expressed by percentage may influence segregation in following generations. Percentage of hulled kernels on parent form influences amount of hulled condition in heterozygous offspring. Average percentage of offspring agrees closely with that of parent forms. In order to answer second question, seed of F_1 heterozygous plants were separated into two lots, hulled and hullless, and planted separately, and their segregation ratios separately determined. In both cases results agreed closely with 1:2:1 expectation, and there was no evident relation between kind of kernel (hulled or hullless) sown from a heterozygous plant, and offspring produced.—There is some reason for assuming the case to be one of multiple factors in which one primary factor pair determines hulled or hullless condition, and other factors influence hulled condition of those plants only that are heterozygous for the primary factors. However, condition of F_1 plants is not in agreement with such hypothesis, for all F_1 plants observed contained fewer-hulled kernels than hullless. Results of different series are rather conflicting and it does not seem possible at present to explain all of them on simple multiple factor hypothesis. It is thought there may be some combinations which have tendency to produce an excess of hullless kernels, thus influencing type of distribution. *John H. Parker.*

421. MACCARDY, H. M. Nuclear reorganization and its relation to conjugation and inheritance in *Arcella vulgaris*. Anat. Rec. 15: 356-357. Jan. 20, 1919. [Author's abstract of paper read before American Society of Zoologists, Baltimore, December 27, 1918.] The data from pedigreed cultures of *Arcella vulgaris* maintained from September, 1917, to August, 1918, have given the following conclusions: 1. A given individual produces a limited number of daughter cells. The number varies from none to twenty-seven (the highest found). 2. These daughter cells and in turn their offspring behave in a similar way with the exceptions indicated. 3. After a period of fairly regular successive vegetative divisions, a period of "depression" occurs. Some of the features marking this period are: reduced activity (feeding, locomotion, division), "punctate" shells, "empty" shells, increased mortality. These are incidental, not essential. 4. Individuals passing successfully through this period may give rise to a new line unlike that from which it came—a marked change in size, for example. This is a "mutation." On the other hand, the new may be like the old line. A new period of vegetative divisions sets in and continues until another period of depression is reached. 5. While some members of a line are "depressed," others conjugate. 6. In pedigreed cultures of exconjugants the two members of the pair tend to produce the same numbers of daughter cells. This is in agreement with the fission rate of exconjugants in *Paramecia* (Jennings). 7. In lines derived from exconjugants, after a period of vegetative divisions, individuals pass again into another period of depression, when the changes noted above and (or) conjugation may be repeated. 8. Preparations of cells made during "depression," and of conjugating cells show remarkably similar conditions of both chromidial net and nuclei. Old nuclei are broken up and new nuclei are formed. This is the period of nuclear reorganization. This may occur within a single individual or through conjugation of two individuals. (In both permanent and temporary mounts.) 9. The inheritance of size shows changes at these periods in individual lines. 10. The following modifying factors should be mentioned: Cultural conditions influence the procedure—unfavorable conditions appear to hasten "depression" and very favorable conditions to delay it. The different nuclei do not always divide at the same time or pass through similar stages together. There is also evidence to show that the essential change may occur with no great break in the usual course of events, and the new arise almost or quite imperceptibly.—H. M. McCurdy.

422. MACINNES, L. T. **The testing of pure-bred cows in New South Wales.** Jour. Heredity 9: 307-335. Nov., 1918.—Traits of milk and butter-fat production are hereditary. Author's effort during four years of testing to define these traits in families has brought encouraging results. Tables indicate increased productiveness of 20 per cent in butter and 25 per cent in milk.—R. K. Nabours.

423. MORGAN, T. H. **Several ways in which gynandromorphism in insects may arise.** Anat. Rec. 15: 357. Jan. 20, 1919.—[Author's abstract of paper read before American Society of Zoologists, Baltimore, December 27, 1918.]—Gynandromorphs have appeared in *Drosophila* 3 times in 16,837 flies; 32 times in 42,409; 2 times in 4,979 and 3 in 24,000; thus in the ratio of 1 to 2300. There is evidence that nearly all of them start as females; 19 were more female than male; 14 were half male and half female; and 6 were more male than female. Practically all the cases found are demonstrably due to elimination of one sex-chromosome soon after fertilization. A few call for other chromosomal relations. Rarely one may even have begun as a male, but nearly all cases supposed at first to belong to this category have proved to be due to mutation in the sex-chromosome. All cases of hybrid gynandromorphs found in bees can also be explained by the theory of chromosomal elimination. A few cases in *Drosophila* seem to be explicable only on the assumption of a bi-nucleated egg, and this explanation is the only one found so far that will give a consistent explanation of Toyama's two gynandromorphs in the silkworm moth. Bi-nucleated eggs have been described by Doncaster in other moths.—T. H. Morgan.

424. NEWMAN, C. C., and L. A. LEONIAN. **Irish potato breeding.** South Carolina Agric. Exp. Sta. Bull. 195. 28 p., 19 fig. 1918.—See Bot. Absts. 2, Entry 693.

425. OSTENFELD, C. H. [Rev. of: LOTSY, J. P. **Evolution by means of hybridization.** Nijhoff: s'Gravenhage. 1916. Zeitschr. Abstamm. Vererb. 20: 42-45. Sept. 1918.

426. OSTENFELD, C. H. [Rev. of: LOTSY, J. P. **La quintessence de la théorie du croisement. (The quintessence of the theory of crossing.)** Arch. Néerland. 3: 351-353. 1917. (See Bot. Absts. 2, 439.) Zeitschr. Abstamm. Vererb. 20: 46. Sept., 1918.

427. RASMUSON, H. [Rev. of: ROSEN, D. **Zur Theorie des Mendelismus. 1. Über scheinbare Koppelungs- und Abstossungsphänomene bei gewissen polymeren Spaltungen. 2. Über den analytischen Wert von Rückkreuzungen. (To the theory of Mendelism. 1. On apparent coupling and repulsion-phenomena in certain polymeric segregations. 2. On the analytical value of back crossing.)** Bot. Notiser 1916: 289-298. 1916.] Zeitschr. Abstamm. Vererb. 19: 207. June, 1918.

428. SCHEPPEORELL, WILLIAM. **Susceptibility to hay fever, and its relation to heredity, age, and seasons.** U. S. Public Health Rep. 1918: 1191-1196. July 19, 1918.—Since pollens causing hay fever are inhaled by all within their radius, but only 1 per cent of population are affected, it would seem that those subject have idiosyncrasy making them susceptible. Investigation of 415 cases showed that 36.5 per cent had relatives of first degree (father, mother, brother, sister) who also suffered from hay fever.—J. P. Kelly.

429. SCHIEMANN, E. [Rev. of: MALINOWSKI, E. **Über die durch Kreuzung hervorgerufene Vielförmigkeit beim Weizen. (On the variability of wheat induced by crossing)** Extrait Compt. Rend. Soc. Sci. Varsovie 9: 733-756. 1916.] Zeitschr. Abstamm. Vererb. 19: 219. June, 1918.

430. SCHIEMANN, E. [Rev. of: LEHMANN, E. **Bakterienmutationen Allogonie. Klonumbildungen. (Mutations in Bacteria. Allogony. Clone formation.)** Centralbl. Bakt. Parasit. 1916: 289-300. 1916.] Zeitschr. Abstamm. Vererb. 20: 60-61. Sept., 1918.

431. SCHIEMANN, E. [Rev. of: REVIS, C. **Variation in Bacterium coll.** Proc. Roy. Soc. London 86: 373-376. 1913.] Zeitschr. Abstamm. Vererb. 20: 61-62. Sept., 1918.

432. SCHIEMANN, E. [Rev. of: SIMON, J. Über die Verwandtschaftsverhältnisse der Leguminosen-Wurzelbakterien. (On the relationships among the root-nodule Bacteria of the Leguminosae.) *Centralbl. Bakt. Parasit.* 1914: 470-479. 1914.] *Zeitschr. Abstamm. Vererb.* 20: 62-63. Sept., 1918.

433. SCHOUTEN, S. L. [Dutch Rev. of: BEYERINCK, M. W. De enzymtheorie van de erfelijkheid. (The enzyme theory of heredity.) *Versl. gew. Verg. K. Akad. Wet. (Wis. Natuurk.)* Amsterdam 25: 1231-1245. 1917.] *Genetica* 1: 98-100. Jan., 1919.

434. SIEMENS, HERMAN W. [Rev. of: LENZ, DR. FRITZ. Eine Erklärung des Schwankens der Knabenziffer. (An explanation of the decrease in number of boys.) *Arch. Rassen- u. Gesellschaftsbiol.* 11: 629. 1914-15.] *Zeitschr. Abstamm. Vererb.* 19: 308-309. June, 1918.—See Bot. Absts. 2, Entry 48.

435. SIRKS, M. J. De kritische punten van het evolutievraagstuk. [Critical points of the evolution hypothesis.] *Genetica* 1: 70-91. Jan., 1919.

436. SIRKS, M. J. [Rev. of: GATES, R. R. Heredity and mutation as cell phenomena. *Amer. Jour. Bot.* 2: 519-528. 1915.] *Zeitschr. Abstamm. Vererb.* 19: 303-304. June, 1918.

437. SIRKS, M. J. [Rev. of: HONING, J. A. Variabilität der Bastardspaltung. Variabilität der Bastardspaltung. (Variability of hybrid splitting.) *Versl. gew. verg. K. Akad. Wet. (Wis. Natuurk.)* Amsterdam 25: 794-804. Nov., 1916.] *Zeitschr. Abstamm. Vererb.* 19: 204-205. June, 1918.

438. SIRKS, M. J. [Rev. of: LOTSY, J. P. Over Oenothera Lamarckiana als type van een nieuwe groep van organismen, die der Kernchimären, benevens beschouwingen over de waarde der genenhypothese in de erfelijkheids- en evolutieleer. Über Oenothera Lamarckiana als Typus einer neuen Gruppe von Organismen, derjenigen der Kernchimären, nebst Betrachtungen über den Wert der Genenhypothese in der Vererbungs- und Evolutionslehre. (On Oenothera Lamarckiana as type of a new group of organisms, that of the nuclear chimeras, and speculations concerning the value of the genotype hypothesis in the study of heredity and evolution. 52 p., 2 pl. *Nijhoff: s'Gravenhage.* 1917.] *Zeitschr. Abstamm. Vererb.* 20: 48-49. Sept., 1918.

439. SIRKS, M. J. [Rev. of: (1) LOTSY, J. P. La quintessence de la théorie du croisement. The quintessence of the theory of crossing.) *Arch. Néerland. Sci.* 3: 351-353. 1917. (See Bot. Absts. 2, Entry 426.) (2) IDEM. L'Oenothera de Lamarck (Oenothera Lamarckiana de Vries), considérée comme chiméra nucléaire. (Lamarck's Oenothera (Oenothera Lamarckiana de Vries) considered as a nuclear chimera.) *Arch. Néerland. Sci.* 3: 324-350. 1917.] *Zeitschr. Abstamm. Vererb.* 20: 49-50. Sept., 1918.

440. SIRKS, M. J. [Rev. of: MAYER-GMELIN, H. De kruising van roode ongebaarde spelt met fluweelkaf Essex-tarwe, een voorbeeld van Factoren-analyse. Die Bastardierung von rotem unbeganntem Spelt mit Essex-samtweizen, ein Beispiel einer Faktorenanalyse. Crossing of a red unbarred spelt with velvet-chaff Essex wheat, an example of factorial analysis.) *Cultura* 29: 141-159. 2 pl.] *Zeitschr. Abstamm. Vererb.* 20: 51. Sept., 1918.

441. SIRKS, M. J. [Rev. of: LOTSY, J. P. Het verband tusschen onze opvatting omtrent het ontstaan der sorten en wetenschappelyke teelt. Die Beziehungen zwischen unserer Auffassung der Artentstehung und wissenschaftlicher Züchtung. (The relation between our conception of the origin of species and scientific breeding.) *Med. d. Verenig. tot bevorder. van wetenschappelyke teelt in Nederland* 7: 1-33. 2 pl. 1917. *Zeitschr. Abstamm. Vererb.* 20: 53. Sept., 1918.

442. SIRKS, M. J. [Rev. of: TIESSZS, K. *De veredeling van de suikerbiet. (Zuckerrübenzüchtung). (Improvement of the sugar beet.)* Med. d. Vereenig. tot bevorder. van wetenschappelyke teelt in Nederland 8: 1-28. 8 fig. 1917.] Zeitschr. Abstamm. Vererb. 20: 53-54. Sept., 1918.
443. SIRKS, M. J. [Rev. of: SIRKS, M. J. *Stérilité, auto-inconceptibilité et différentiation sexuelle physiologique.—Sterilität, Selbstunempfänglichkeit und physiologische Geschlechts-differentiation. (Sterility, self-incompatibility and physiological differentiation of the sexes.)* Arch. Néerland. Sci. 3: 205-234. 1917.] Zeitschr. Abstamm. Vererb. 20: 58-59. Sept., 1918.
444. SIRKS, M. J. [Rev. of: REESE, A. N. *Variations in the vermilion spotted newt, *Diemictylus virens*.* Amer. Nat. 50: 316-320. 1916.] Zeitschr. Abstamm. Vererb. 20: 63. Sept., 1918.
445. SIRKS, M. J. [Rev. of: KROON, H. M. *De kruisingen in de huistiereteelt in Nederland, getoet aan de tegenwoordige begrippen over erfelijkheid.—Die Bedeutung der Bastardierung in der Niederländischen Haustierzüchtung, an dem gegenwärtigen Vererbungsstandpunkte geprüft. (Hybridization in the breeding of domestic animals in Holland, tested on the basis of present views of heredity.)* Med. d. Vereenig. tot bevorder. van wetenschappelyke teelt in Nederland 6: 1-62. 1917. Zeitschr. Abstamm. Vererb. 20: 63-64. Sept., 1918.
446. SIRKS, M. J. [Rev. of: NICHOLS, J. T. *On primarily unadaptive variants.* Amer. Nat. 50: 565-574. 1916.] Zeitschr. Abstamm. Vererb. 20: 64. Sept., 1918.
447. SMITH, L. H. *Outline of a plan for corn breeding.* Illinois Agric. Exp. Sta. Circ. 221. 4 p. 1918.—See Bot. Absts. 2, Entry 711.
448. SPILLMAN, W. J. [Rev. of: BARCOCK, E. B., and R. E. CLAUSEN. *Genetics in relation to agriculture. (See Bot. Absts. 1, Entries 210, 220, 244.)*] Jour. Heredity 9: 361. Dec., 1918.
449. STARK, MARY B. *An hereditary tumor.* Jour. Exp. Zool. 27: 509-529. 3 pl. Feb., 1919.—See Bot. Absts. 2, Entry 1249.
450. STARK, MARY B. *An hereditary tumor in the fruit fly, *Drosophila*.* Jour. Cancer Res. 3: 279-301. 1 pl., 2 fig. July, 1918.—See Bot. Absts. 2, Entry 1248.
451. STURTEVANT, A. H. *An analysis of the effects of selection.* Carnegie Inst. Washington Publ. 265. 18 X 26 cm., 63 p., 1 pl., 14 fig. Washington, D. C., 1918.—*Dichaete*, a mutant race of *Drosophila melanogaster*, was selected in both directions for bristle number. Both plus and minus lines were obtained. By means of linkage tests, using known and readily classifiable characters, these plus and minus lines were shown to differ in definite modifying factors. Modifiers were found to exist in the second and also in the third chromosome. Specific evidence was obtained, showing that contamination of allelomorphs did not occur. The cases adduced since 1914, especially by Castle, as evidence that contamination occurs in other forms, are analyzed in detail. Author concludes that modification of genes by selection or contamination has never been demonstrated, and is not in accord with the experimental results. Hypothesis of modifying factors has been experimentally verified in certain of these cases, and is sufficient to account for results obtained by its opponents.—T. H. Morgan.
452. TAMMES, TINE. [Rev. of: (1) BEIJERINCK, M. W. *De enzymtheorie der erfelijkheid. (The enzyme theory of heredity.)* Versl. gen. Verg. K. Akad. Wet. Amsterdam. 25: 1231 1917. (2) IDEM. *The enzyme theory of heredity.* Proc. Kon. Akad. van Wetensch. Amsterdam, 19: 1275. 1917.] Zeitschr. Abstamm. Vererb. 19: 202-203. June, 1918.

453. TAMMES, TINE. [Rev. of: KAPTEYN, J. C. Skew frequency curves in biology and statistics. *Receuil Trav. Bot. Néerland.* 13: 105-157. 1916.] *Zeitschr. Abstamm. Vererb.* 19: 205-206. June, 1918.
454. TAMMES, TINE. [Rev. of: BATESON, W. Note on experiments with flax at the John Innes Horticultural Institution. *Jour. Genetics* 5: 190-201. 1915-16. *Zeitschr. Abstamm. Vererb.* 20: 50. Sept., 1918.
455. TAMMES, TINE. [Rev. of: SURFACE, FRANK M. On the inheritance of certain glume characters in the cross *Avena fatua* × *A. sativa* var. Kherson. *Proc. National Acad. Sci. U. S. Amer.* 2: 478-484. 1 fig. 1916. *Zeitschr. Abstamm. Vererb.* 20: 51-52. Sept., 1918.
456. TAMMES, TINE. [Rev. of: SAUNDERS, EDITH R. A suggested explanation of the abnormally high records of doubles quoted by growers of stocks (*Matthiola*). *Jour. Genetics* 5: 137-158. 1915-16. *Zeitschr. Abstamm. Vererb.* 20: 54. Sept., 1918.
457. TAMMES, TINE. [Rev. of: SAUNDERS, EDITH R. On the relation of half-boariness in *Matthiola* to glabrousness and full boariness. *Jour. Genetics* 5: 145-158. 1915-16.] *Zeitschr. Abstamm. Vererb.* 20: 54-55. Sept., 1918.
458. TAMMES, TINE. [Rev. of: SAUNDERS, EDITH R. On selective partial sterility as an explanation of the behavior of the double-throwing stock and the *Petunia*. *Amer. Nat.* 50: 496-498. 1916.] *Zeitschr. Abstamm. Vererb.* 20: 55-56. Sept., 1918.
459. TAMMES, TINE. [Rev. of: GATES, R. R. On pairs of species. *Bot. Gaz.* 61: 177-212. 12 pl. 1916.] *Zeitschr. Abstamm. Vererb.* 20: 57-58. Sept., 1918.
460. TAMMES, TINE. [Rev. of: CHILD, C. M. Studies on the dynamics of morphogenesis in experimental reproduction and inheritance. 9. The control of head-form and head-frequency in *Planaria* by means of potassium cyanide. *Jour. Exp. Zool.* 21: 101-125. 1916.] *Zeitschr. Abstamm. Vererb.* 20: 58. Sept., 1918.
461. THIEM. [Rev. of: HERTWIG, OSCAR. Das Werden der Organismen. Eine Widerlegung von Darwins Zufallstheorie. [The "becoming" of organisms. An argument against Darwin's chance-theory.] 710 p., 116 fig. G. Fischer: Jena, 1916.] *Arch. Rassen- u. Gesellschaftsbiol.* 13: 81-93. 1918.
462. UBISCH, G. v. Kritische Betrachtungen zur Hypothese der primären und sekundären Koppelung. [Critical consideration of the hypothesis of primary and secondary coupling.] *Zeitschr. Abstamm. Vererb.* 19: 193-201. 3 fig. June, 1918.—See Bot. Absts. 3, Entry 238.
463. UBISCH, G. v. [Rev. of: (1) LEHMANN, E. Art, reine Linie, isogene Einheit. [Species, pure line, isogenic unit.] *Biol. Centralbl.* 24: 285-294. 1914. (2) LOTKY, J. P. Prof. E. Lehmann über Art, reine Linie, isogene Einheit. [Prof. E. Lehmann on species, pure line, isogenic unit.] *Ibid.* 24: 614-618. 1914. (3) LEHMANN, E. Art, reine Linie, isogene Einheit. II. Species, pure line, isogenic unit. II.] *Ibid.* 25: 555-560. 1915.] *Zeitschr. Abstamm. Vererb.* 20: 41-42. Sept., 1918.
464. WEATHERWAX, PAUL. Improved technique for corn pollination. *Proc. Indiana Acad. Sci.* 1917: 105-107. 2 fig. 1918.—See Bot. Absts. 3, Entry 301.
465. WEATHERWAX, PAUL. Variation and varieties of *Zea Mays*. *Proc. Indiana Acad. Sci.* 1917: 99-103. 1918.—See Bot. Absts. 3, Entry 300.
466. WEATHERWAX, PAUL. Gametogenesis and fecundation in *Zea Mays* as the basis of xenia and heredity in the endosperm. *Bull. Torrey Bot. Club* 46: 73-90. Pl. 6-7, 2 fig. Mar., 1919.—See Bot. Absts. 2, Entry 717.

467. ZADE, A. *Der Hafer. Eine Monographie auf wissenschaftlicher und praktischer Grundlage.* [Oats. A monograph on scientific and practical principle.] 8 vo., 355 p., 32 fig. Fischer: Jena, 1918. Book written from standpoint of practical agriculture but contains chapters on the cultural history, relationship, derivation, and varietal classification of oats. Opposes Nilsson-Ehle's view that his supposed mutations which resembled the wild oat (*Avena fatua*), were true mutations, and holds that they were results of crossing with the wild oats [From rev. by E. BAUR in Zeitschr. Abstamm. Vererb. 20: 52-53. Sept., 1918.]—G. H. SHULL

MORPHOLOGY, ANATOMY AND HISTOLOGY

E. W. SINNOTT, *Editor*

THALLOPHYTES

468. JANET, CHARLES. *Sur le Botridium granulosum.* Compt. Rend. Acad. Sci. Paris 166: 900-963. 13 fig. 1918.—*Botridium granulosum* is described as arising from motile zoospores or non-motile aplanospores ('propagules'). The reproductive cell gives rise to a spherical vesicle, with chloroplasts and nuclei imbedded in a peripheral cytoplasmic layer, the central part of the vesicle being filled with a clear liquid. The development of the mature plant from this "blastema syncytiale" is by an outgrowth upward to form the cylindrical pyriform aereal part and other outgrowths downward to form the rhizoids. The non-motile aplanospores arise by the transformation of the protoplasmic stratum of certain vesicles into minute cells each of which becomes a "propagule." The vesicle bursts open and the aplanospores are scattered by the rain. They germinate immediately. In zoospore formation the protoplasm of the vesicle shows marked increase in the number of chloroplasts and nuclei. The chloroplasts elongate and a nucleus becomes associated with each. The cytoplasm immediately around each associated nucleus and chloroplast becomes delimited by a membrane. A single flagellum is formed, the zoospore swims for a short time, becomes quiescent and develops into a new plant in the same manner as the aplanospores.—In a few individuals, late in the growing season, strong suggestions of sexual reproduction are seen. A portion of protoplasm, provided with a nucleus and chloroplasts becomes separated from the rest by a membrane, appearing first like a zoospore mother cell. This cell, however, develops at once, within the mother plant to form a hollow spherical vesicle, absorbing all of the remaining protoplasm. The contents of this vesicle divide up into minute bodies, some of which were observed to have a distinct red stigma. Although none were seen with cilia nor was there any evidence of fusion of these bodies the author is of the opinion that they are gametes.—F. A. McAllister.

469. YENDO, KICHIASABURO, AND JIRO IKARI. *Auxospore formation of Chaetoceros debile Cleve.* Bot. Mag. Tokyo 32: 145-149. Pl. 2 (8 fig.). 1918.—All stages in auxospore formation occurred in great abundance in April, 1918, at the Marine Laboratory of Oshoro. The authors were able to observe complete series and to follow the entire development of individual auxospores and their subsequent germination. The whole process occupied about seven hours. Their account confirms the earlier reports of Schultz and Gran. The asexual auxospores are formed by the contraction of the cell contents and migration through an oval lateral pore. The extruded protoplast remains attached to the old filament, where it increases in size and then begins division at right angles to the old filament. The new filaments have a diameter nearly twice that of the auxospore-forming filaments.—Leonas L. Burlingame.

BRYOPHYTES

470. DOUIN, C., AND DOUIN, R. *Le Reboulia Raddi.* Rev. Gén. Bot. 30: 129-145. 5 fig. 1918.—*Reboulia* is autoicous, sometimes becoming apparently dioicous by the abortion of one sexual apparatus; it is never paricous. Genus is distinguished from other Marchantiaceae by formation of male receptacle toward apex of a ventral or subfloral branch, female receptacle appearing at apex of a separate branch which has developed apically from male-

producing shoot. Under exceptional conditions a thallus may terminate in a female receptacle without having borne a male one; or of two branches resulting from a dichotomy, one may bear a female, the other a male, receptacle.—Three species are recognized, two of them new; they are distinguished by structure of female receptacles, character of spores, and position of male receptacles.—Rays are defined as divisions of female head which protect the piliferous cavities; lobes, as those parts which cover and protect the involucre. On this basis, the greater number of species of *Marchantia* and all species of *Preissia* have rays only, those of *Preissia* being much reduced; *Lunularia*, *Clevea*, *Saunteria*, and *Ptilolepis* have neither rays nor lobes; the remaining species of *Marchantia* (for which a separate genus, *Marchantopsis*, is proposed), and all other genera of Marchantiaceae have lobes only, their rays being rudimentary or indistinct. [See Bot. Absts. 1, Entry 1047.]—C. E. Allen.

PTERIDOPHYTES

471. BROWN, J. G. Prothallia of *Tmesipteris*. [Review of: Holloway, J. E. The prothallus and young plant of *Tmesipteris*. Trans. New Zealand Inst. 50: 1-44. 1917. (See following Entry, 472.)] Plant World 21: 241-243. 1918.—Reviewer summarizes author's results and regards the paper as a very valuable one. Criticizes adversely the illustrations and the use of "loose" terminology.—E. W. Sinnott.

472. HOLLOWAY, J. E. The prothallus and young plant of *Tmesipteris*. Trans. New Zealand Inst. 50: 1-44. Pl. 1-3. 1917.—Author states that *Tmesipteris* occurs commonly throughout New Zealand as an epiphyte on stems of tree ferns and other forest trees, and where rainfall is very heavy, in heaps of humus on the ground at bases of trees. His young plants were secured in the latter situation. Series of prothallia found by him measure from 1 to 18 mm. in length. The unbranched forms are carrot-shaped, tapering down from a fairly thick head. Sooner or later the head of the prothallium forks dichotomously. Archegonia and antheridia are borne over the entire surface of the prothallium. Some space is given to a description of the anatomy, embryology and development of the sporophyte. Author concludes that *Tmesipteris* exhibits so little resemblance to any other class of Pteridophyta, living or extinct, that its phylogenetic position remains a matter of uncertain speculation. [See preceding Entry, 471.]—J. H. Faull.

473. THOMPSON, J. M. The anatomy and affinity of *Stromatopteris monilliformis* Mett. Trans. Roy. Soc. Edinburgh 52: 133-156. Pl. 1-4. 1918.—Paper based on two incomplete herbarium specimens and a fertile leaf. Author concludes that *Stromatopteris* ranks with the *Gleichenias*, but is a xerophytically reduced type.—J. H. Faull.

474. THOMPSON, J. M. A further contribution to the knowledge of *Platzoma microphyllum* R. Br. Trans. Roy. Soc. Edinburgh 52: 157-165. 1918.—Three types of spores are found on pinnae of *Platzoma microphyllum*. Majority of sporangia are small and contain about 32 small spores each. Remaining sporangia are large and contain about 16 large spores each. Spores of intermediate size are developed when spore output in any sporangium is greatly decreased. Markings in all 3 types of spores are similar. Author favors view that *Platzoma* is truly heterosporous, but has not yet effected a demonstration.—J. H. Faull.

SPERMATOPHYTES

475. ANONYMOUS. Tetramerous flowers of *Narcissus*. Jour. Roy. Hort. Soc. 43: 34. 1918.—Two specimens from different sources showed in each case eight perianth parts, eight stamens, and four carpels. The tetramerous condition seems not to be so rare in *Narcissus* and nearly allied forms.—C. E. Allen.

476. BOWLES, E. A. Two-flowered snowdrop. Jour. Roy. Hort. Soc. 43: 31. 1918.—A plant of *Galanthus Elwesii* showed the usual two foliage leaves from the soil, the flowering

stem bore a third leaf about three inches above the soil, in the axis of which was a second flower. It appears that the axis of the bulb had elongated, carrying the flowering stem up above ground.—C. E. Allen.

477. DAHLGREN, K. V. O. Die jüngeren Entwicklungsstadien der Samenanlagen von *Typha latifolia* L. [Early stages of seed-formation in *Typha latifolia*.] Svensk Bot. Tidskr. 12: 207-211. 8 fig. 1918.—The formation of the embryo-sac is not of the *Lilium* type, but the macrospore mother-cell gives rise to 4 macrospores, 3 of which break down. Occasionally two macrospore mother-cells are present and each produces an 8-celled embryo-sac. The primary archesporial cell divides to form the macrospore mother-cell and a cover cell, which divides to form part of the nucellus. The epidermal tissue of the nucellus is found to be composed of two cell layers.—C. H. Farr.

478. EKSTRAND, HARRY. Zur Zytologie und Embryologie der Gattung *Plantago*. [Cytology and embryology of *Plantago*.] Svensk Bot. Tidskr. 12: 202-206. 7 fig. 1918.—In one individual of *Plantago major* there were a few diakinetik stages found in which only part of the chromosomes are paired. The unpaired ones do not lie in the equator of the metaphase spindle, do not divide, and are unequally distributed to the daughter nuclei. There result pollen grains of various sizes, the smaller of which do not last long. In another individual all reduction division stages were normal. An occasional anomalous unfertilized embryo-sac is found, such as one with 16 nuclei, or 7 nuclei, or with two large and many small nuclei. Some of these are fertilized, but their subsequent history is unknown.—C. H. Farr.

479. GRIER, N. M. Double flowers in *Hemerocallis fulva* Linn. Torrey 18: 242. 1918.—Six specimens of double flowers in this species were collected at Kirkwood, Missouri. The plant bearing these flowers was apparently typical and there was no indication of insect injury in connection with the flowers. The flowers show a perianth of 12 distinct alternating segments; 12 stamens, some of which may be abortive; 2 styles, united and frequently abortive into a claw-shaped body; ovules minute. It is suggested that the term *diploous* be applied to such flowers.—Margaret C. Ferguson.

480. HAZEN, T. E. The trimorphism and insect visitors of *Pontederia*. Mem. Torrey Bot. Club. 17: 450-484. 2 pl., 18 fig. 1918.—A summary of previous work on trimorphism in this and related genera is given, and a morphological study of the flower is presented from the standpoints of trimorphism and adaptability to insect visitors. There is also a discussion of cross pollination between the three types of flowers, accompanied by diagrams. Among insect visitors, species of Lepidoptera, Hymenoptera and Diptera are listed. [See Bot. Abstr. 1, Entry 830.]—V. A. Pease.

481. JAUCH, BERTHE. Quelques points de l'anatomie et de la biologie des Polygalacées. [On the anatomy and biology of the Polygalaceae.] Bull. Soc. Bot. Genève 10: 47-84. 15 fig. 1918.—The author concludes that the genus *Xanthophyllum* is not to be separated as a distinct family from the Polygalaceae, as Gagnepain has maintained; in spite of its regular flowers and of other differences of generic importance, its close relationship with the Polygalaceae is shown by the relation of its floral parts and by the form of its pollen. A detailed study was made of the floral structures of *Polygala Chamaebuxus*, with which were compared those of other species of the same section, particularly *P. venenosa*, and of one species of *Securidaca*. Mention is also made of various points noted in the study of other species of *Polygala*. Experiments show that the flowers of *Polygala Chamaebuxus* are self-sterile; those of *P. vulgaris*, on the contrary, are self-fertile. Descriptions are given of the course of the vascular bundles in the flower, the development and dehiscence of the anther, and the structure of the pistil in *P. Chamaebuxus*. Some or occasionally all of the anthers of a flower may be sterile, as a result of a breaking down of the sporogenous cells in a manner analogous to that normally characteristic of the cells of the tapetum. The bicarpellate ovary contains two cavities separated by a thin partition; on each side of this partition is a single ovule.

The placentation is thus apparently axile but in reality parietal, as is shown by the innervation of the ovules. This is found to be true also in the other species examined. The macrospore mother cell divides to form three cells, of which the innermost develops into an embryo sac of typical form. The polar nuclei unite shortly before fertilization. In the more primitive members of the family the anther has four loculi; types of anthers with three or two loculi, found in various species, are the result of a reduction from the original type. The nectarial disk (when this is not reduced to a small gland without vascular tissue, as it is in *Polygala chamaecubus*) is innervated from the androecium. Lysigenous glands, found numerous in the leaves and various parts of the flowers of certain American species, suggest a relationship between this family and the Terebinthinaceae (Burseraceae).—C. E. Allen.

432. RATCLIFF, H. W. Double-spathed *Richardia*. Jour. Roy. Hort. Soc. 43: 31. 1918. —The development of an extra spathe is not very uncommon in some species of *Richardia*. An example of this kind in *R. africana* showed slight green markings on the second, lower spathe.—C. E. Allen.

433. SHAW, W. R. Some microtechnical methods and dexters. Philippine Jour. Sci. Bot. 13: 241-261. Fig. 5. 1918.—As a result of several years of teaching, and of collecting and preparing materials, the author has developed modifications of methods laid down in the various laboratory handbooks, and presents several ingenious ways of using microscope; equipment so as to avoid multiplication of accessory parts, and hence to keep down the expense of laboratory equipment. He discusses ocular micrometers used as stage micrometers; the square-ruled micrometer used as a position indicator, and also for drawing to scale; the use of capillary glass rods for cover-glass supports, and methods for making autographic records on micrographic slides, and for recording magnification on micrographic negatives, of special interest to those working with plankton, and with relatively large objects mounted entire, are his methods developed during a study of the Volvocaceae of the vicinity of Manila. Hastening the concentration of glycerine by means of the vacuum pump, a method for making sealed glycerine mounts of the larger Volvocaceae, and an adaptation of the Osterhout method for rapid mounting of large objects in water media are described; a new form of plankton net is described; two washing devices for small objects are figured and described, and methods of estimating the number of cells in spherical surfaces are given. [See Bot. Abstr. 2: Entry 332.]—V. A. Pease.

434. SOUEGES, R. Embryogenie des Liliacées. Developpement de l'embryon chez l'*Anthericum ramosum*. [Embryogeny of Liliaceae. Embryo development in *Anthericum ramosum*.] Compt. Rend. Acad. Sci. Paris 167: 34-36. 1918. —The early stages in development of the embryo of *Anthericum* are here traced, and compared with the corresponding stage in *Sagittaria* and *Myosurus*. The conclusion is reached that the embryogeny of monocotyledons and dicotyledons is fundamentally the same, although presenting differences which suggest the possibility of establishing relationships among the families of the two great groups. M. A. Chrysler.

435. TACKHOLM, G., AND E. SÖDERBERG. Neue Beispiele der simultanen und sukzessiven Wandbildung in den Pollen-mutterzellen. [New examples of simultaneous and successive wall-formation in pollen-mother-cells.] Svensk. Bot. Tidsk. 12: 189-201. 9 fig. 1918. —The pollen-mother-cells of *Aristolochia fimbriata* undergo successive bipartition by cell plate but those of *A. Sipho* divide by quadripartition. In the latter there is found to be a slight thickening of the spindle fibers after the heterotypic nuclear division but no cell plate or wall is produced. After the homoeotypic nuclear division, walls are laid down as fine plates at the equator of the several spindles. The microspores are usually in a perfect tetrahedral arrangement, whereas in *A. fimbriata* there are none so oriented. In *Asarum europaeum*, however, which is characterized by quadripartition, there are some perfect tetrads and some of other forms. In *Vinca rosea* the microspores are for the most part arranged in perfect tetrads. It is therefore concluded that the mother-cell must divide by quadripartition, although Frye

and Blodgett found a few tetrads in the related genus *Apocynum* in which there was only bipartition of the mother cells. In *Albizia lophanta* the mother-cell undergoes two somatic divisions, forming a group of 4 cells. The nucleus of each of these then passes through the heterotypic and homoeotypic mitoses successively and the cell is finally divided by quadripartition. This latter process is said to take place by the formation of partitions as equatorial plates in the spindles. Quadripartition is reported for 3 other species of dicotyledons: *Epimedium nivicum*, *Piper subpeltatum*, and *Saururus cernuus*. It was also found in one monocotyledon, *Dioscorea quinquefolia*, where it takes place by means of equatorial plates on the spindles. Six other monocotyledons were found to have bipartition. In *Canna*, tetrads were found, but it is not held that this is strong evidence of a previous quadripartition. The 9 text figures show interkinetic, mitotic and tetranuclear stages, respectively, but none are given of cytokinesis. The authors apply the occurrence of the two types of division to the systematic classification of angiosperms.—C. H. Farr.

486. VISCHER, W. Sur une monstruosité syncaulome du *Taraxacum officinale* Weber. [Syncauly in *Taraxacum officinale*.] Bull. Soc. Bot. Genève 10: 21-25. 2 fig. 1918.—In the case described, a hollow cylinder 2-3 cm. in diameter bears at the top 7 or 8 heads, some clearly distinct, others confluent; within the cylinder are 12 free stalks bearing normal heads and some leaves. In the cylinder are two concentric series of bundles, of which those in the outer series are normally oriented, but those of the inner series have their phloem turned toward the center of the cylinder. The author concludes that the case in question is one of connection or coherence, rather than of fasciation strictly speaking. Fasciation proper results from the replacement of a growing point by a growing line, produced (according to Church and Worsdell) by a repeated dichotomy. In the present case there seems to have been a union of growing points originally separate, their number not increasing toward the apex.—C. E. Allen.

487. WORSDELL, W. C. Stipules of hawthorn. Jour. Roy. Hort. Soc. 43: 29. 1918.—Leaves of *Crataegus sinica* show transitions between leaf segments and so-called "stipules," demonstrating that the latter are parts of the lamina, and not true stipules.—C. E. Allen.

488. WORSDELL, W. C. Many-flowered tulips. Jour. Roy. Hort. Soc. 43: 35. 1918.—Branched tulips are common, especially among Darwin varieties in many gardens. The many-flowered condition arises from adnation of branches, not from fasciation. Branching occurs in *Tulipa biflora*, *T. saxatilis* and *T. praestans*.—C. E. Allen.

PALEOBOTANY AND EVOLUTIONARY HISTORY

EDWARD W. BERRY, Editor

489. BERRY, EDWARD W. Pleistocene plants from Tennessee and Mississippi. Torrey 19: 8-10. Jan., 1919.—Records *Osmunda* sp., *Quercus predigitata* Berry and *Castanea pumila* Mill. from the Pleistocene at Adamsville, McNairy County, Tennessee; and nutlets of *Celastrus mississippiensis* Bosc. from the Loess at Vicksburg, Mississippi, the last not heretofore known in the fossil state.—E. W. Berry.

490. BERRY, EDWARD W. The age of the Brandon lignite and flora. Amer. Jour. Sci. 47: 211-216. Mar., 1919.—Discusses the fossil flora from this classic locality in Vermont, and from a consideration of the floral evidence and the indicated climatic conditions at the time of the deposit of the Brandon lignite as compared with other deposits of known age, concludes that the Brandon lignite and its contained flora could not be Miocene in age as many students have supposed, but belongs in the earlier half of the Tertiary period (Eocene).—E. W. Berry.

491. HOWE, M. A. On some fossil and recent Lithothamnaceae of the Panama Canal Zone. U. S. National Mus. Bull. 103: 1-13. pl. 1-11. 1918 (1919).—Describes the following new

species: *Archaeolithothamnium episporum* from the Pleistocene and Recent, *Lithothamnium roughanii* from the Oligocene Culebra formation, *Lithothamnium isthmi* from the Oligocene Emperador limestone, and records *Lithoporella melobesioides* Foslie from the Oligocene Emperador limestone.—E. W. Berry.

492. POLLOCK, JAMES B. Blue-green algae as agents in the deposition of marl in Michigan lakes. Michigan Acad. Sci. 20: 247-260. Pl. 16-17. 1918.—See Bot. Absts. 2, Entries 555, 623.

493. TRELEASE, WM. The ancient oaks of America. Mem. Brooklyn Bot. Gard. 1: 492-501. July 6, 1918.—Exclusive of those now referred to the family prototype, *Dryophyllum*, or believed to represent genera not comprised in the Fagaceae, the nominal North American fossil oaks number about 150, or somewhat less than half as many as the species now living. Of these about one-third pertain to each of three geologic period,—48 for the Cretaceous, 56 for the Eocene, and 42 for the Miocene. Little is known of Pliocene oaks, but four North American and four Brazilian species have been described. From Pleistocene or glacial deposits, 20 are known. These are essentially identical with oaks now living in the regions where the fossils have been found; the Pliocene oaks are also of modern types, but as yet less clearly identifiable with living species. None of the earlier fossils is believed to have survived from one geologic period to another.—For convenience of comparison, the Cretaceous and Tertiary oaks have been arranged on their leaf-form into 14 general groups. Of these, one with oleander-like leaves, one with ash-like foliage, two with alder-like foliage and one with birch or haw-like leaves, are found scarcely comparable with existing oaks if, indeed, they pertain to *Quercus*. A bayberry-like type and one with small trilobed leaves are equally questionable. One group with magnolia-like foliage and two with chestnut-like leaves suggest certain groups that are living now; and two groups, respectively with lobed and pungently toothed leaves, are even more suggestive of existing oaks. The collective impression made by these ancient American oaks is that in the several geologic ages they have re-evolved a multiplicity of comparable foliage forms from a single initial and that this has been of the semi-xerophytic small holly-like type; but that no traceable ancestry of existing species is to be looked for earlier than very late Tertiary time. In one Tertiary oak (*Q. Palaeo-alex*) Hengstenberg finds a fore-shadowing of all existing foliage types; but the species of America are believed by the writer to have developed independently of those now growing in Europe and Asia, probably assuming their present specific characters toward the end of Tertiary time.—Wm. Trelease.

PATHOLOGY

DONALD REDDICK, Editor

494. AGRELLIUS, F. U. G. Data concerning the dissemination of wheat rust *Puccinia graminis* Pers. Trans. Kansas Acad. Sci. 28: 115-117. 1916-17.—The possibility of epiphytiosis of stem rust of wheat being due to the rust carrying over on grasses is presented. The names of a few grasses bearing rust as they appear in Kansas are named, but the species of rust is not identified. No examination was made morphologically or physiologically of these facts.—L. E. Melchers.

495. BANCROFT, C. K. Diseases in plants with special reference to fungi parasitic on crops in British Guiana. Jour. Board. Agric. British Guiana 11: 47-57. 1918.—A brief review is given of the nature and causes of diseases in plants. Methods for preparing and applying different fungicides are described. The following list of fungi which cause diseases in British Guiana is given. Sugar cane: *Marasmius sacchari*, *Leptosphaeria sacchari*, *Melanconium sacchari*, *Thielaviopsis paradoxa*, *Colletotrichum falcatum*, *Cercospora vaginiae*; rice: *Pyricularia oryzae*, *Tilletia horrida*, *Sclerotium oryzae*; cocoanut: *Bacillus* sp., *Pestalotzia palmarum*; cacao: *Marasmius perniciosus*, *Phytophthora juheri*, *Thyridaria tarda*, *Nectria baintii*, *Cor-*

tium salmonicolor; coffee: *Sclerotium* sp., *Stilbum nanum*, *Hymenochaete noxia*, *Colletotrichum coffeae*, *Sphaerostilbe flavida*; lime: *Sphaeropsis tumefaciens*, *Fusarium limonis*, *Hymenochaete noxia*, *Loranthus theobromae*, *Capnodium citricolum*, *Colletotrichum gloeosporioides*; orange: *Penicillium olivaceum*, *Fusarium limonis*; Para rubber: *Melanopsammopsis ulae*, *Pomes semitostus*, *Hymenochaete noxia*, *Thyridaria tarda*; mango: *Gloeosporium mangiferae*, *Dimerosporium mangiferae*; bread fruit: *Gloeosporium mangiferae*; banana: *Bacillus* sp., *Ustilaginoidella oedipogera*, *Gloeosporium musarum*; maize: *Ustilago maydis*; cotton: *Colletotrichum gossypii*, *Bacillus gossypinus*; sisal: *Colletotrichum agaves*; grape: *Uncinula spiralis*, *Penicillium glaucum*, *Guignardia bidwellii*; papaw: *Pucciniopsis caricae*; tomato: *Bacillus solanacearum*; pepper: *Colletotrichum nigrum*; ground nut: *Cercospora personata*; cassava: *Cercospora cearae*; pineapple: *Penicillium* sp., *Thielaviopsis paradoxa*.—J. B. Rorer.

496. BANCROFT, C. K. The mango and bread fruit disease. Jour. Board Agric. British Guiana 11: 75. 1918.—This disease caused by *Gloeosporium mangiferae* has caused an enormous loss of fruit during the past six months. The disease may occur on fruit of all ages and makes it unfit for consumption. Two sprayings with bordeaux mixture are sufficient to control the disease; the first should be made when the fruit is set and the second, three or four weeks later.—J. B. Rorer.

497. BARRETT, J. T. Bacterial gummosis of apricots. Preliminary report. Monthly Bull. State Comm. Hort. [California] 7: 137-140. Fig. 16-18. 1918.—The disease is similar if not identical with gummosis of stone fruits described by Barss and others in Oregon. Inoculations with pure cultures of bacteria from cankers gave infection. Preliminary experiments with the surgical methods employed for control of pear blight give indications of success. The disease may prove as serious for apricots in California as blight (*Bacillus amylovorus*) is for pears.—D. Reddick.

498. BARSS, H. P. Bacterial gummosis of stone fruits. Monthly Bull. State Comm. Hort. [California] 7: 121-136. Fig. 4-14. 1918.—Nature, cause and control of gummosis caused by *Pseudomonas cerasi*, based largely on previously reported work by the author.—D. Reddick.

499. BEACH, WALTER S. The *Fusarium* wilt of China aster.—Rept. Michigan Acad. Sci. 20: 281-308. 1918.—See Bot. Absts. 2, Entry 624.

500. BISBY, G. R. A *Fusarium* disease of garden peas in Minnesota. (Abstract.) Phytopath. 8: 77. 1918.—A species of *Fusarium* has been proved pathogenic. It attacks the germinating seed and also causes wilt of plants by attacking roots and stem.—D. Reddick.

501. BRANDES, E. W. Banana wilt (Panama disease). Porto Rico Agric. Exp. Sta. Rept. 1916: 29-31. Pl. 4-5. 1918.—Proof of the pathogenicity of *Fusarium cubense* for banana and a technical description of the organism.—D. Reddick.

502. BRYCE, P. I. Injurious fungi of Ste. Anne de Bellevue. 1917. Ann. Rept. Quebec Soc. Prot. Plants 10: 49-51. 1918.—The following diseases are mentioned as injurious: apple: black rot and canker, scab; bean: blight and anthracnose; corn: smut; currant: leaf spot; anthracnose, rust; hollyhock: rust; pear: scab; plum: shothole, brown rot; potato: early blight and especially late blight; tomato: blossom end rot and Septoria leaf-spot.—A table is included which shows the mean temperature and precipitation for the growing season of 1917 as compared with the previous ten-year average.—Sclerotia of *Claviceps purpurea* were germinated abundantly without the action of frost.—D. Reddick.

503. BURT, EDWARD ANGUS. Corticiums causing Pellicularia disease of the coffee plant; hypochneose of pomaceous fruits, and Rhizoctonia disease. Ann. Missouri Bot. Gard. 5: 119-132. Fig. 1-5. 1918.—See Bot. Absts. 1, Entry 395.

534. COOK, MELVILLE, T. **Report of the Department of Plant Pathology.** Ann. Rept. New Jersey Agric. Exp. Sta. 1916: 561-625. 1918.—This publication takes up climatic condition of the year, epidemics of diseases and a list of the most common diseases of the year. It also includes papers by W. H. Martin, by W. S. Krout and by H. Clay Lint.—*M. T. Cook.*

505. COOK, MELVILLE, T. **Report of the Department of Plant Pathology.** Ann. Rept. New Jersey Agric. Exp. Sta. 1917: 523-563. 1918.—This publication outlines the investigations in progress, epidemics of diseases, plant disease survey and a list of the common diseases of the year. It also includes papers by R. F. Poole, by W. H. Martin and by Mel. T. Cook.—*M. T. Cook.*

506. COONS, G. H. **Michigan potato diseases.** Michigan Agric. Exp. Sta. Special Bull. 53. 49 p., 41 fig. 1918.—Popular descriptions with illustrations and notes on the distribution in Michigan of the following diseases: late blight (*Phytophthora*), early blight (*Alternaria solani*), tip burn, scab (*Actinomyces chromogenus*), black scurf (*Rhizoctonia*), wilt (*Fusarium*), black leg (*Bacillus atrocephalus*), curly dwarf, leaf roll, mosaic, dry rots (caused by *Fusarium* spp., also *Armillaria mellea*). Various tuber troubles, hollow heart, frost injury, internal brown spot, etc. are described. Methods of controlling the diseases are stated.—*D. Reddick.*

507. DEMANDT, ERNST. **Untersuchungen über Kanker und Braunküle am samoanischen Kakao.** [Investigation of canker and brown rot of Samoan cacao.] Zeitschr. Pflanzenkr. 28: 241-251. 1918.—In 1904 a canker disease of cacao made its appearance in the rather extensive plantations in Samoa. The disease was not thought at first to be contagious. A commission appointed by the government, attributed it to poor soil. By 1909 the canker had spread over large areas causing great damage and killing thousands of trees. About this time another disease referred to as brown rot, made its appearance. This rot attacked the cacao fruits. In order to determine the nature of these two diseases which threatened cacao culture in Samoa, the government obtained the services of Dr. Gehrmann a plant pathologist. Gehrmann studied both diseases and came to the conclusion that canker was caused by a *Fusarium* which he designated *Fusarium samoense* n. sp. He reported brown rot as due to *Phytophthora* sp. Both canker and brown rot occur in other cacao producing countries such as Ceylon, Java and Trinidad. All workers have agreed that brown rot is caused by *Phytophthora faberi* Maubl. but there is disagreement among them as to the cause of the canker. The author after careful study and infection experiments concludes that both brown rot and canker are caused by *Phytophthora faberi*. He finds *Fusarium samoense* closely associated with *Phytophthora* in the cankers but shows that it is a saprophyte. *Phytophthora faberi* attacks fruits and stems of *Hevea brasiliensis*, which is sometimes planted along with cacao. The author gives the results of experiments on the cacao diseases and a summary of the methods by which they may be held in check.—*L. O. Kunkel.*

508. DODGE, B. O., AND J. L. ADAMS. **Some observations on the development of Peridermium cerebrum.** Mem. Torrey Bot. Club 17: 253-261. Pl. 4-6, 3 fig. 1918.—A description of the galls produced by *Peridermium cerebrum* on *Pinus rigida* growing in the pine barrens of New Jersey and on *P. virginiana* in Virginia. It is thought that infection usually takes place when the trees are from one to four years old. The fungus often spreads peripherally from the point of infection by a series of sudden localized migrations and stimulates the production of several galls in the same canker, the center gall being the oldest. The spermatia are produced on spermatophores which form practically a continuous layer over the gall. The origin and the development of aecia are discussed in some detail. No instance has been found where spermatogonia and aecia are following each other on the same area of the same gall, however both may develop on different parts of the same gall. Observations seem to indicate that there is an alternation of aecia and spermatogonia as previously reported by other workers. Successful infection experiments have been made on the following species of oak: *Quercus ilicifolia*, *Q. marylandica*, and *Q. heterophylla*. [See Bot. Absts. 2, Entry 282.]—*J. L. Weimer.*

509. DODGE, E. M. Potato diseases. VII.—Late blight (*Phytophthora infestans* de Bary). S. African Fruit Grower 5: 47. 1918.

510. DODGE, E. M. Walnut blight (*Bacterium juglandis* Pierce). S. African Fruit Grower 5: 68. 1918.

511. DODGE, E. M. Potato diseases, VIII. Internal brown fleck. S. African Fruit Grower 5: 94. 1918.

512. ELLIOTT, J. A. Arkansas peach diseases. Arkansas Agric. Exp. Sta. Bull. 149, 9 p., 6 pl. 1918.—Brief descriptions and illustrations of the following diseases with notes on their prevalence, destructiveness and control in Arkansas: Brown rot (*Sclerotinia cinerea*), black spot (*Bacterium pruni*), scab (*Cladosporium carpophilum*), leaf curl (*Eriosema deformans*), crown gall (*B. tumefaciens*), die back (*Valsa leucostoma*), root rot (*Armillaria mellea*), wood rots (*Coriolus versicolor*, *Pycnoporus cinnabarinus* and *Schizophyllum commune*).—D. Reddick.

513. GILES, P. L., AND J. O. CARRERO. Chlorosis of sugar cane. Porto Rico Agric. Exp. Sta. Rept. 1917: 10-20. 1918.—In extreme cases the leaves are of normal size but creamy white in color; in mild cases the veins are green thus giving the leaf a striated appearance. The trouble occurs in numerous restricted areas in southern part of island, the areas ranging in size from a few square feet to an acre. Chlorosis may appear at any stage of growth from two months after planting up to the time of earrowing.—Analyses of soil were made from a large number of fields of healthy and of diseased cane to determine whether chlorosis is associated with an excessive amount of carbonate of lime. "While chlorotic cane was found only on markedly calcareous soils, all calcareous soils did not produce chlorotic cane."—Analysis of ash of green and chlorotic leaves shows that the only consistent difference is a reduced amount of iron in chlorotic leaves.—Painting leaves of chlorotic plants with 0.5 per cent solution of ferrous sulfate caused them to turn green; dusting them with powdered sulfate had no effect. Spraying with sulfate of iron is impracticable as a means of control because of the necessity of frequent applications.—Field experiments were performed which "show that the chlorosis is ameliorated to some extent by the application of stable manure containing ferrous sulfate and stable manure alone, but small applications of these materials produced only slight improvement and larger applications, though more effective, by no means overcame the chlorosis completely."—D. Reddick.

514. GRAY, GEO. P. The consumption and cost of the economic poisons in California. 1916. Monthly Bull. State Hort. Comm. [California] 7: 140-144. 1918.—Estimates for the various materials are based on figures furnished by County Horticultural Commissioners in 28 counties representing 70 per cent of the acreage of fruit in the state. Total estimated expenditure for poisons (fungicides, insecticides, etc.) \$2,468,000.—D. Reddick.

515. GRAY, GEO. P. Wettable sulfurs. Monthly Bull. State Hort. Comm. [California] 7: 191-192. 1918.—Use of powdered glue, 1.5 ounces, and hot water, 3 gallons, for 10 pounds of powdered sulfur.—D. Reddick.

516. HODGSON, ROBERT W. Black smut of figs. Monthly Bull. State Comm. Hort. [California] 7: 188-189. 1918.—See Bot. Abst. 1, Entry 518.

517. HODGSON, ROBERT W. Little leaf of deciduous fruits. Monthly Bull. State Comm. Hort. [California] 7: 529-532. 1918.—The disease occurs to a certain extent in all parts of California but is more common in trees grown in light, sandy soil. Evidence is presented tending to support the theory that the trouble is due to drought.—D. Reddick.

518. HODGSON, ROBERT W. Citrus blast. Quart. Bull. State Plant Bd. Florida 2: 123-130. Pl. 3-4, fig. 77. 1918.—Description of the disease, caused by *Bacterium citrefaciens*, as it occurs in California.—D. Reddick.

519. HARLAND, S. C. Tomato breeding in St. Vincent. *Agric. News Barbados* 17: 10, 1918.—Describes crosses made between the St. Vincent native tomato and Ponderosa. In the F₂ generation some plants were immune to the Blossom End Rot, a disease to which Ponderosa is very susceptible in St. Vincent. The St. Vincent native tomato is immune to this disease. Some plants of this generation showed a greater power of resistance to *Bacterium solanacearum* than others.—J. B. Rorer.

520. HUGHES, H. D. Improved method of fighting smut in oats. *Iowa Agric. Exp. Sta. Circ.* 45. 8 p., *illustr.* 1918.—The atomizer method of treatment described. One pint of formaldehyde diluted with 1 pint of water is sufficient for 50 bushels of seed. Iowa oat fields showed an average of 7.5 per cent of smut in 1912-1913.—Variety Early Champion is more susceptible to smut than others and in general early varieties are more susceptible than late ones.—D. Reddick.

521. JEHLE, R. A. Effect of disinfectants upon *Bacterium citri*. *Quart. Bull. State Plant Bd. Florida* 2: 112-123. 2 pl. 1918.—An exhaustive test to determine the maximum time required, by certain disinfectants, to kill the organism. Technique employed is fully described. The following substances were tested and in the concentrations indicated: mercuric chlorid 1:500, 1:1000, 1:1500, 1:2000, 1:2500, 1:3000; chlorazene, 1:250, 1:500, 1:1000, 1:1500, 1:2000; trikresol, 0.5, 1.2 and 3 per cent solutions; lysol, 0.5, 1.2 and 3 per cent solutions; creolin (Pearson), 1:50, 1:75, 1:100; carbolic acid, 0.8, 1, 2, 3, 4 and 5 per cent solutions; formaldehyde, numerous concentrations from 0.8 to 3.2 per cent solutions; kresol, zenolium, carbolinium and maldezene in several dilutions; copper sulphate, 2 to 8 per cent solutions. Since pruning tools and the like when dipped into a solution usually become dry within one minute, the following minimum concentrations of germicides should be used for disinfection purposes: mercuric chlorid 1:1500; chlorazene, 1:250; trikresol, lysol and creolin, 1 per cent solution; formaldehyde 3.2 per cent (8 per cent commercial), kresol, 1:40; carbolinium, full strength.—The addition of "red soil," 10 per cent by weight, to solutions of mercuric chlorid did not decrease the germicidal action.—*B. citri* was killed in mercuric chlorid, 1:1500, at 80°F. in thirty seconds and at 44° F. in forty seconds.—D. Reddick.

522. JOHNSTON, J. R. Diseases of sugar-cane in tropical and sub-tropical America, especially the West Indies. (With notes by S. F. ASHBY, C. K. BANCROFT, W. NOWELL, and J. A. STEVENSON.) *West Indian Bull.* 16: 275-308. 7 pl. 1918.—The history and exact descriptions of the following diseases and fungi are given; the gumming disease (*Bacterium vasculare*), humid gangrene, stem-rot or Iliau (*Gnomonia iliau*), red leaf spot (*Eriosphæria sacchari*), smut (*Ustilago sacchari*) thread blight (*Hypochnus sacchari*), root disease (*Marasmius sacchari* and *M. stenophyllus*), red rot (*Colletotrichum falcatum*), rind fungus (*Melanconium sacchari*), wilt (*Cephalosporium sacchari*), pineapple disease (*Thielaviopsis paradoxa*), brown leaf spot (*Cercospora longipes*), red spot of leaf sheath (*Cercospora vaginæ*), yellow leaf spot (*Cercospora kopkei*), eye leaf spot (*Helminthosporium sacchari*), red rot of leaf sheath (*Sclerotium rolfsii*), *Trichosphaeria sacchari*, *Sphaerella sacchari*, *Leptosphaeria sacchari*, *Thyridaria larida*, *Nectria laurentiana*, *Odontia saccharicola*, *O. sacchari*, *Scizophyllum commune*, *Lateralnea columnata*, *Cytospora sacchari*, *Coniothyrium melasporum*, *Darlucia melaspora*, *Diplodia cacaecoides*, *Melanconium saccharinum*, and *Himantia stellifera*. Yellow stripe, top rot, sereh, mottling disease, wither tip and chlorosis, the causes of which are unknown or nonparasitic, are also described. The author deals principally with the diseases as they occur in Cuba and Porto Rico; their prevalence and importance in Jamaica, British Guiana, Barbados and Porto Rico are discussed in the notes.—The root disease caused by *Marasmius sacchari* is by far the most destructive in the area dealt with. Nomenclature of *Melanconium sacchari* is thoroughly discussed and it is stated that there is no connection between this fungus and *Trichosphaeria sacchari*.—As control measures are recommended selection of healthy and where possible resistant seed, disinfection of seed, rotation of crops, reduction of injury or wounds in standing canes and cutting cane before it becomes overripe.

A bibliography of 39 titles is given. The majority of the illustrations have been copied from previous papers.—J. B. Rorer.

523. KEZER, ALVIN, AND WALTER G. SACKETT. Beans in Colorado and their diseases. Colorado Agric. Exp. Sta. Bull. 234. 32 p., illust. 1918.—Bean streak is described as new. It has the general appearance of blight and the same organs are affected. The cause is not known.—Bacteriosis (*Ps. phaseoli*) is the commonest and most destructive disease. Anthracnose (*C. lindemuthianum*) and rust (*U. appendiculatus*) are of little consequence.—D. Reddick.

524. LEMÉE, E. Dégâts causés dans les jardins de la région d'Alençon par les principaux ennemis des plantes potagères et des arbres fruitiers. (Printemps-été 1917). [Damage caused in Alençon by the principal enemies of garden plants and fruit trees.] Jour. Soc. Nation. Hort. France 19: 42-48, 61-64, 74-76. 1918.

525. McCURBIN, W. A. Tomato diseases. Dominion Exp. Farm [Canada] Bull. 37: 18 p., 8 fig. 1918.—Diseases common on tomatoes in southern Ontario are described and control methods given. A key based on readily recognized features is supplied.—W. A. McCubbin.

526. MELHUS, I. E., AND I. H. VOGEL. Cabbage diseases. Iowa Agric. Exp. Sta. Circ. 46. 4 p., 3 fig. 1918.—Popular description of blackleg, blackrot, club root and yellows with methods of control for Iowa conditions.—D. Reddick.

527. MILLER, C. C. Treatment of gummosis with carbolineum. Monthly Bull. State Comm. Hort. [California] 7: 488-493. 4 fig. 1918.—Lemon gummosis caused by *Pythium citrophthora* and by *Botrytis vulgaris*. Scraping out diseased tissue and painting the wound with various substances (including mercuric chlorid and bordeaux paste) gave no better results in 1248 treatments than merely scraping out the cankered area.—Carbolineum (*Arenarius*) painted over the cankered area, on 2700 trees in 1917, and without removing the bark seems to have effected a cure. "Of the 2700 cases not one has been observed to break out again beneath the treated area."—D. Reddick.

528. MILLER, CARROLL C. Bud curl of the lemon tree. Monthly Bull. State Comm. Hort. [California] 7: 515-519. Fig. 70-73. 1918.—See Bot. Abst. 1, Entry 967.

529. NOWELL, W. Diseases of economic plants. West Indian Bull. 16: 322-327. 1918.—Report of various diseases affecting the different economic plants of the West Indies during the year 1916. A fungous disease of *Cuscuta* was observed in Grenada which seemed to effect a useful measure of control.—J. B. Rorer.

530. NOWELL, W. Eel-worm disease (blackhead) of bananas. Agric. News Barbados 17: 206. 1918.—The disease occurs in Grenada on the coarse banana known as bluggoe. The presence of the disease is most evident in plants that are reaching the bearing age. The outer leaves and partially developed bunch of fruit frequently dry up, the general appearance being that the plants lack water and nourishment. The whole root system is dead and the adjacent parts of the bulb are black and disorganized. No fungi or bacteria were uniformly present in the diseased tissues. Nematodes were regularly present and their eggs were found in the least altered and deepest seated of the discolored tissues, and in some cases the worms themselves were seen occupying the cells of undecayed tissue close to the central cylinder of the roots. The disease is probably the same as that of Jamaica and Fiji.—J. B. Rorer.

531. ORTON, W. A. Breeding for disease resistance in plants. Amer. Jour. Bot. 5: 273-283. 1918.—See Bot. Abst. 1, Entry 235.

532. OSKAMP, JOSEPH. Winter injury of fruit trees. Indiana Agric. Exp. Sta. Circ. 87. 12 p., 9 fig. 1918.

533. PAUL, B. H. White pine blister rust. New York Conserv. Comm. Bull. 15. 257. 6 fig. (1 colored). 1918.—A description of the disease and of *Cronartium ribicola*. Distrib-

tion in New York. "There is already so much blister rust in New York State that it can not be stamped out immediately. But with full cooperation there is a possibility that large areas of our white pine forest land can be protected and the growing of white pine in those areas continued."—There is appended the text of a state law on the control and suppression of white pine blister rust and currant rust and of official quarantine notices. —D. Reddick.

534. PAULSEN, F. A propos du court noue. [About court noue.] Prog. Agric. et Vitic. 70: 462-466. 1918.—A translation by P. Antoniadis of the author's report of the results of experiments conducted in Palermo and forwarded to the editors of this journal. A letter transmitting these results and containing some brief remarks in regard to them was published in the same volume of this journal, page 75, July, 1918. The results of growing different varieties of grapes on different stocks on infected soil are given. Rupestris du lot on its own roots became severely affected with the disease. The hybrids of Berlandieri showed at the end of two years a large percentage of diseased plants. The Riparia always gave good results showing little disease even when planted in infected soil. The author believes that the "germs of infection" remain in the soil. In regard to the cause of the disease, however, he says that he believes it to arise spontaneously and to develop and spread as a form of auto-intoxication produced by possible secretions of poisonous substances which roots of certain varieties seem to absorb.—As the disease is believed to remain in the soil for years, infected land should be planted to other crops for several years before planting to vines again. Application of lime, iron-sulphate and other chemicals gave only negative results. —C. L. Shear.

535. REIMER, F. C. A new disinfectant for pear blight. Monthly Bull. State Comm. Hort. [California] 7: 562-565. 1918.—Healthy trees were wounded and the wounds smeared with a pure culture of *Bacillus amylovorus*. Disinfectants were immediately applied, except on checks, with a brush as follows: bordeaux paste; mercuric chlorid, 1:500; cresol, 5 per cent solution; mercuric cyanide, 1:500; lime-sulfur solution, 10 per cent; chlorozone, 1:500. Blight developed in every case except where mercuric cyanide was used. At 1:1000 this material is not always effective and at 1:300 it causes injury to trees. The cyanide is not as effective as the chlorid for disinfecting metal tools.—Preliminary trials with formaldehyde (10 per cent commercial) indicate that it may be the best known disinfectant for pear blight work. —D. Reddick.

536. SHIRAI, MITSUTARO. On the development of plant pathology in Japan: A brief historical sketch. Ann. Phytopath. Soc. Japan 1: 1-4. 1918.—See Bot. Abstr. 2, Entry 302.

537. STAKEMAN, E. C., J. H. PARKER, AND F. J. PIEMEISEL. Can biologic forms of stem rust on wheat change rapidly enough to interfere with breeding for rust resistance? Jour. Agric. Res. 14: 111-124. 5 pl. 1918.—See Bot. Abstr. 1, Entry 500.

538. STEVENSON, JOHN H. The green muscardine fungus in Porto Rico. Jour. Dept. Agric. Porto Rico 2: 19-32. Pl. 1. 1918.—*Metarrhizium anisopliae* was introduced in Porto Rico in 1911 to aid in the suppression of various injurious insects. "The conclusion seems justified that the green muscardine will not serve as a practical means of controlling the white grubs or May-beetles in Porto Rico." A bibliography of 43 titles is appended. —D. Reddick.

539. STEVENSON, JOHN A. Citrus diseases of Porto Rico. Jour. Dept. Agric. Porto Rico 2: 43-123. Fig. 1-25. 1918.—A compendium of citrus diseases of the island based on four years experience. Introduction contains cultural directions, including practices for grove sanitation and spraying; the appendix contains direction for preparing fungicides and insecticides. The following diseases are described and methods of control are stated when known: damping off; crown rot (*Sclerotium rolfsii*); root rot (usually poor drainage); foot-rot or mal-di-gomma; gummosis (several types); Diplodia canker and dieback, wood rot; pink disease (*Corticium salmonicolor*); dieback or exanthema; withertip (*Colletotrichum*

gloeosporoides); scab [*Cladosporium citri*]; melanose (*Phomopsis citri*); algal leaf spot (*Cephalauros virescens*); freckling; sooty mold; fruit rots, or shipping rots; and various other minor diseases.—D. Reddick.

540. SWINGLE, D. B., AND H. E. MORRIS. Crown gall injury in the orchard. Montana Agric. Exp. Sta. Bull. 121: 121-130. Fig. 1-6. 1918.—A record of the behavior of 120 healthy apple trees, 12 each of 10 varieties, and 120 trees showing well developed galls of *Bacterium tumefaciens*. Nursery stock was set in 1910 and records of development kept for eight years. At this time a few galls had disappeared but most of them were growing. Very few new galls developed. No tree had died as a result of the disease and "no very great difference was apparent between the tops of the diseased and of the healthy trees, though a good observer could notice that the healthy ones had made a little better growth. The root systems of the diseased trees, however, were very inferior." The average reduction in circumference of diseased trees as compared with healthy ones was 1.58 inches.—Location of the gall, or hairy root, is of considerable importance, since lateral developments resulted in little injury and girdling galls resulted in pronounced dwarfing. The tree is weakened at the point of attachment of the gall and breaks off easily.—A review of pertinent literature is included. D. Reddick.

541. TANAKA, TYOZABURO. Notes on some fungous diseases and a new codling moth attacking the persimmon in Japan. Monthly Bull. State Comm. Hort. [California] 7: 461-463. 1918.—Brief review of 14 papers on persimmon diseases and insects published in Japanese between the years 1905 and 1917.—D. Reddick.

542. TAUBENHAUS, J. J. Pox, or pit (soil rot), of the sweet potato. Jour. Agric. Res. 13: 437-450. Pl. 51-52. 1918.—The author reviews the past history of this disease and the publications concerning it, and then gives the results of recent investigations by himself and others.—The roots are disfigured and the yields reduced by the presence of the disease. *Cyathospora batata* is considered the cause of the disease and not *Acrecystis batatas*. Contact of healthy roots with the active organism is necessary for infection. The disease is said to be equally active in wet and dry weather, but the greatest damage occurs during dry weather. The fungus is believed to be spread by soil adhering to the tools in wet weather, also by water. Rotation of crops tends to decrease the disease and is regarded as the most practical method of controlling the trouble. [See Bot. Absts. 1, Entry 446.]—C. L. Shear.

543. WELDON, GEO. P. Pear growing in California. Monthly Bull. State Comm. Hort. [California] 7: 219-410. Fig. 1-185. 1918.—Chapter 13 (p. 343-370, fig. 144-184) is devoted to bacterial and fungous diseases of the pear and methods of control employed in California. Most of the chapter deals with pear blight caused by *Bacillus amylovorus*.—D. Reddick.

544. WINBERG, O. E. F., G. C. STARCHER, AND C. L. ISBELL. Report on freeze injury to citrus trees for 1916 and 1917, with notes on orange culture in south Alabama. Alabama Agric. Exp. Sta. Bull. 199. 28 p., 7 pl. 1918.

PHYSIOLOGY

B. M. DUGGAR, Editor

GENERAL

545. STILES, W. Botany as the science of the living plant. New Phytol. 17: 251-257. 1918.—A pedagogical article on the teaching of botany, with emphasis on the importance of the physiological aspect.—S. M. Zeller.

PROTOPLASM, MOTILITY

546. SCHIMD, GÜNTHER. Zur Kenntnis der Oscillarienbewegung. [Movement in Oscillaria.] Flora 11-12: 327-379. 1918.

DIFFUSION, PERMEABILITY

547. HARVEY, R. B., AND R. H. TRUE. Root absorption from solutions at minimum concentrations. *Amer. Jour. Bot.* 5: 516-521. Fig. 1-2. 1918.—The equilibrium of electrolytes in respect to plants grown in water culture was found to depend on the particular plant used, and, when the concentration lay between the toxic limit and the essential limit, it was independent of the salt used, the concentration of the electrolyte, or the volume of the solution. The CO_2 equilibrium of the air, the rate of cleavage of iron-producing compounds, and the reabsorption of the ions determined the electrolyte content at the point of equilibrium.—R. W. Webb.

548. OSTWALD, WOLFGANG. Zur Theorie der Osmose und Ultrafiltration kolloider Lösungen. [The theory of osmosis and ultrafiltration of colloidal solutions.] *Kolloid-Zeitschr.* 23: 68-78. 1918.

549. RENNER, O. Versuche zur Mechanik der Wasserversorgung. [The mechanics of water absorption.] *Ber. Deut. Bot. Ges.* 36: 172-179. 1918.—Renner answers Nordhausen's criticism (*Berichte*, 1916) of his earlier work (*Flora*, 1911) on water movement in plants, and gives a number of experiments to confirm, in the main, his earlier generalizations. He also gives a brief statement on the "saturation deficit" and the "energetics of water movement" in plants.—William Crocker.

550. RIPPPEL, AUGUST. Semipermeable Zellmembranen der Pflanzen. [Semipermeable cell membranes.] *Ber. Deut. Bot. Ges.* 36: 202-218. 1918.

WATER RELATIONS

551. JOHNSTON, EARL S. A simple non-absorbing atmometer mounting. *Plant World* 21: 257-260. Fig. 1. 1918.—The difficulties attending the filling of non-absorbing atmometers are briefly discussed. A simple modification of the Shive mounting is suggested. This consists in omitting the longer tube extending to the top of the cup and inserting in the shorter tube a tube of slightly smaller diameter drawn down to a capillary tube and bent in the form of a U. The open end of the U just extends into a small quantity of mercury which is placed in the space between the larger and smaller tube. The mercury is prevented from escaping by means of a small piece of rubber tubing fitted around the joint between the two tubes at the place of insertion.—Henry Schmitz.

552. PEARSON, G. A. The relation between spring precipitation and height growth of western yellow pine saplings in Arizona. *Jour. Forestry* 6: 667-689. Fig. 1-3. 1918.—It is found that spring precipitation is the most important of the factors studied in the height growth of this species.—R. W. Webb.

MINERAL NUTRIENTS

553. OIJEN, L. W. H. VAN. Zur Kenntnis der antagonistischen Salzwirkungen. [Antagonistic salt action.] *Biochem. Zeitschr.* 87: 418-424. 1918.

554. PLUMMER, J. K. Availability of potash in some common soil-forming minerals and effect of lime upon potash absorption by different crops. *Jour. Agric. Res.* 14: 297-315. Pl. 1. Fig. 1-4. 1918.—Employing pot cultures of oats, soy beans, rye, and cowpeas, which were supplied with potash in the form of biotite, muscovite, orthoclase, microcline and potassium sulfate, the author found that the weight of the dry matter produced varied with the source of the potash. Potassium sulfate gave the greatest dry weight, with biotite, muscovite, orthoclase, and microcline following in descending order. The effects of lime used in conjunction with the different materials is also noted.—R. A. McGinty.

555. POLLOCK, J. B. Blue green algae as agents in the deposition of marl in Michigan lakes. Rept. Michigan Acad. Sci. 20: 247-260. Pl. 16-17. 1918.—Marl beds composed largely of concretionary pebbles are deposited in association with several Cyanophyceae and may be deposited in the total absence of *Chara* which was supposed to be the chief agent in marl deposition. These pebble marls are characteristic of shallow lakes and are a purer form of marl than is generally deposited by *Chara*. The rate of deposition varies widely in different beds, however, the maximum rate is probably one foot in seventy-five years. It is very probable that minute water organisms of various kinds absorb the carbon dioxide from the water for metabolic processes and leave the calcium carbonate to precipitate upon the twigs, plants, or bottom of the pool. [See Bot. Absts. 2, Entry 623.]—R. P. Hibbard.

556. STOKLASA, JULIUS. Über die Verbreitung des Aluminium-Ions in der Pflanzenwelt. [The distribution of aluminium ions in diverse plants.] Biochem. Zeitschr. 88: 292-322. 1918.—Xerophytes contain only a small aluminium content, at times only traces, in the various organs of the plant. Hydrophytes and hygrophilous plants are in general characterized by a relatively high aluminium content. Among many plants accumulating aluminium may be mentioned species of *Chara*, *Bryopsis*, species of brown and red marine algae, various species of the Filices, Equisetales, and Lycopodiales. Among higher plants in bog habitats containing high aluminium content are species of *Scirpus*, *Polygonum*, *Rumex*, etc. The author considers that the hygrophilous plants mentioned exhibit a quantitative selection capacity for aluminium ions, which are stored particularly in the subterranean organs. Mesophytes in general contain relatively small amounts of aluminium, unless they grow in moist situations, when the quantity is then noticeably increased.—B. M. Duggar.

557. WEEVERS, TH. Die physiologische Bedeutung des Kaliums in der Pflanze. Schluss-erwiderung auf die Mitteilung Stoklasas. [The physiological significance of potassium in the plant.] Biochem. Zeitschr. 89: 281-282. 1918.

PHOTOSYNTHESIS

558. URSPRUNG, A. Ueber die Absorptionskurve des grünen Farbstoffes lebender Blätter. [The absorption curves of green pigments in living leaves.] Ber. Deut. Bot. Ges. 36: 73-85. 1918.

559. URSPRUNG, A. Ueber die Bedeutung der Wellenlänge für die Stärkebildung. [Wave length and starch formation.] Ber. Deut. Bot. Ges. 36: 86-100. 1918.

560. URSPRUNG, A. Energiekurven des vom Farbstoff grüner Blätter absorbierten Lichtes. [Curves of radiant energy absorbed by green leaves.] Ber. Deut. Bot. Ges. 36: 111-121. 1918.

561. URSPRUNG, A. Ueber das Vorhandensein einer photochemischen Extinktion beim Assimilationsprozess. [The assimilation process and photochemical extinction.] Ber. Deut. Bot. Ges. 36: 122-135. 1918.

METABOLISM (GENERAL)

562. ALBRO, F. W. Chemical constants of avocado oil. Ann. Rept. California Avocado Assoc. 1917: 92-93. 1918. [See Bot. Absts. 1, Entry 501.]

563. BIEDERMANN, W. Mikrochemische Beobachtungen an den Blattzellen von Elodea. [Microchemical observations on leaf cells of Elodea.] Flora 11-12: 560-605. 1918.

564. BLACK, O. F. Calcium oxalate in the dasheen. Amer. Jour. Bot. 5: 447-451. 1918.—Plants which produce calcium oxalate in bundles of fine, needle-like crystals packed in cells when eaten raw invariably cause a burning sensation in the mouth. This work shows that calcium oxalate crystals are the cause of the acrid taste of the dasheen, and suggests that the plant be not discarded from the vegetable food supply, inasmuch as the acrid flavor can be removed by proper cooking.—R. W. Webb.

565. BOAS, FRIEDRICH. Weitere Untersuchungen über die Bildung löslicher Stärke bei Schimmelpilzen mit besonderer Berücksichtigung der Frage nach der Eiweiss-synthese der Schimmelpilze. [Concerning the formation of soluble starch by fungi with special reference to protein synthesis.] Biochem. Zeitschr. 86: 110-124. 1918. The formation of soluble starch by *Aspergillus niger* depends upon the hydrogen-ion concentration of the medium. Csapék's work on the synthesis of proteins from the amino acids by fungi is critically examined in the light of the hydrogen-ion concentration of the culture media. It is found that when the media has a sufficient hydrogen-ion concentration *Aspergillus niger*, *Penicillium*, and *Cladosporium* produce greater dry weights of mycelium when ammonium sulfate is the source of nitrogen than when amino acids are substituted.—H. Schmitz.

566. ELLIS, MARY T. Contributions to our knowledge of the plant sterols. I. The sterol content of wheat (*Triticum sativum*). Biochem. Jour. 12: 160-172. 1918. II. The occurrence of phytosterol in some of the lower plants. Biochem. Jour. 12: 173-177. 1918.

567. FELLEBERG, TH. VON. Über die Konstitution der Pektinkörper. [The constitution of pectin bodies.] Biochem. Zeitschr. 85: 118-161. 1918.—An extensive account of pectin bodies of diverse origin, their physical properties, constitution, derivatives, and the formation of fruit jellies.—B. M. Duggar.

568. GOERRIG, ELISABETH. Vergleichende Untersuchungen über den Carotin- und Xanthophyllgehalt grüner und herbstlich gelber Blätter. [Carotin and xanthophyll in green and in autumn leaves.] Beih. Bot. Centralbl. 35: 342-394. 1918. Colorimetric determinations were made of the carotin and xanthophyll content of green leaves at the beginning of the autumn coloration, and of yellow leaves at the height of autumn coloration. The yellow pigments were extracted and separated according to Willstätter's methods. The carotin and xanthophyll extracts, diluted to 50 cc. and 100 cc., respectively, were compared with a 0.2 per cent. solution of potassium bichromate.—It was found that carotin increased or decreased in leaves during yellowing in autumn, depending upon the genus and upon weather conditions. During a clear warm autumn the carotin content of leaves of the following plants increased about twofold: *Aesculus hippocastanum*, *Acer platanoides*, *Fagus sylvatica*, *Platanus orientalis*, *Parrotia persica*, *Vitis coignetiae*. While the carotin content decreased greatly in leaves of the following plants: *Salix babylonica*, *Maclura aurantiaca*, *Broussonetia papyrifera*. In a cold autumn with early frost it was found in all cases, with the exception of *Acer platanoides*, that there was less carotin and less xanthophyll in the yellow than in the green leaves.—Sophia Eckerson.

569. HAMMERSTEN, OLOF. Einige Bemerkungen über das Erbsenlegumin. [Legumin of peas.] Hoppe-Seyler's Zeitschr. Physiol. Chem. 102: 85-104. 1918.

570. JAFFA, M. E., AND F. W. ALBRO. Studies on the composition and nutritive value of some sub-tropical fruits. Ann. Rept. California Avocado Assoc. 1917: 85-91. 1918. [See Bot. Abst. 1, Entry 533.]

571. KAUFFMAN, C. H. The Agaricaceae of Michigan. Michigan Geol. Biol. Survey Pub. 26 (Biol. Ser. 5). Vol. 1, xxvii + 924 p. Frontispiece and fig. 14. 1918. [Vol. 2, in press.] See Bot. Absts. 2, Entry 627.

572. KELLY, W. P. A new sugar in the avocado. Ann. Rept. California Avocado Assoc. 1917: 92. 1918. [See Bot. Absts. 1, Entry 537.]

573. KYLIN, HERALD. Ueber die Fucosanblasen der Phaeophyceen. [Fucosan vacuoles.] Ber. Deut. Bot. Ges. 36: 10-19. 1918.—Hansteen noted that granules, as he called them, accumulate about the chromatophores of Phaeophyceae during carbon-assimilation. He thought they were produced by the chromoplasts and were the first visible product of carbon-

assimilation. On this basis he called them fucosan granules. Kylin has made a rather extensive study of these bodies, the results of which are summarized in the article here reviewed. He finds that these bodies are vacuoles rather than granules and, while they are probably formed by the chromoplast in connection with carbon-assimilation, they are not made up in the main of carbon-synthate. He thinks he has shown that dextrose is the first carbon-synthate of the Phaeophyceae and that this is condensed to laminarin. These vacuoles may be the means by which the synthate leaves the plastid, but it is not stored in them. On the contrary it rapidly diffuses from them into the cytoplasm. He thinks these vacuoles, especially the older ones, are filled with substances resembling tannin but differing from true tannins in some respects. He considers these tannin-like substances as meaningless waste products, which upon oxidation give rise to the brown pigment of this group of plants, phycoerythrin, which was formerly considered a pigment of the chromatophores.—Wm. Crocker.

574. MEYER, ARTHUR. Elweisstoffwechsel und Vergilben der Laubblätter von *Tropaeolum majus*. [Loss of chlorophyll.] Flora 11-12: 85-127. 1918.—Meyer notes that in *Tropaeolum majus* growing in pots in a greenhouse the young leaves at the top of the stem are dark green, while the progressively older ones down the stem are green, bright green, yellow green, yellow and bright yellow, and finally the oldest ones on the plant are wilting. Meyer points out that this change in color is due to the gradual decomposition of the two chlorophylls, while the carotin and xanthophyll remain constant, as this change progresses the chloroplasts become smaller and in the later stages are shriveled granular masses with balls of excreted material about them. With the gradual loss of chlorophyll goes a similar decomposition of the proteins of the chloroplast. It should be mentioned that Meyer adduces evidence for the view that the chloroplast is the main organ for the storage of the proteins manufactured in the foliage leaf, if indeed not the very seat of protein manufacture. The amount of carbohydrates in the leaves also falls with age. Meyer found that when the leaves are placed in darkness no reduction occurs in the proteins until the carbohydrates are greatly reduced by respiration. The decomposition of the proteins then begins, he believes, as a source of carbon chains for respiration. He claims there is no loss of nitrogen from the leaf during this change but that the nitrogen residue remains in the leaf, while the carbon chain of the protein is used for respiration. He apparently gives the following interpretation of the process. As the leaves become older they become weakened. In this weakened condition the photosynthetic power falls. This leads to a great reduction in the amount of carbohydrates in the leaf and finally to the decomposition of the proteins of the chloroplasts as a carbon source for respiration. This decomposition of the proteins is accompanied by the decomposition of the chlorophyll and the change in color.—Wm. Crocker.

575. MEYER, ARTHUR. Das Assimilationssekret von *Vaucheria terrestris*. [Assimilation in *Vaucheria terrestris*.] Ber. Deut. Bot. Ges. 36: 235-241. 1918.

576. MEYER, ARTHUR. Die angebliche Fettspeicherung immergrüner Laubblätter. [Fat storage in evergreen leaves.] Ber. Deut. Bot. Ges. 36: 5-10. 1918.—A number of investigators have claimed that there is a considerable storage of fats in evergreen leaves during the winter. Meyer finds that the droplets that were supposed by these former workers to be fat droplets are not fat and that the total volume of these does not rise and fall with winter and summer, but that it increases continuously with the age of the leaf. He speaks of the droplets as "mesophyllsekret" and points out that little is known of the origin and composition of them. Some of the forms studied were: *Ilex aquifolium*, *Taxus baccata*, *Vinca minor*. The methods used by Meyer, as well as by former workers, are exclusively microchemical.—Wm. Crocker.

577. MOLISCH, HANS. Über den microchemischen Nachweis und die Verbreitung gelöster Oxalate im Pflanzenreiche. [Dissolved oxalates in plants.] Flora 11-12: 60-70. 1918.—Molisch finds dissolved oxalates appearing rather generally distributed in phanerogams. All investigated species of the following families bore much dissolved oxalate: Polygonaceae, Chenopodiaceae, Amarantaceae, Aizoaceae, Begoniaceae, Melastomaceae, Oxalidaceae, Can-

naceae, and Marantaceae. While in most cases this chemical character, like many other chemical characters, runs by families, this is not always the case. In certain families some genera are very rich in dissolved oxalates while other genera contain little or none. This is true of Comelinaceae and Cactaceae.—Wm. Crocker.

578. MOLISCH, HANS. Beiträge zur Mikrochemie der Pflanzen. No. 10. Ueber Kieselkörper in der Epidermis von *Campella Zanonii*. No. 11. Kristallisiertes Karotin in der Nebenhöhle von *Narcissus poeticus*. [Microchemistry of plants. No. 10. Silica bodies in the epidermis of *Campella Zanonii*. No. 11. Crystallized carotin in the corolla of *Narcissus poeticus*.] Ber. Deut. Bot. Ges. 36: 277-282. 1918.

579. RHEIN, M. Über den Abbau des Tyrosins durch *Bact. coli phenologenes* nebst einer Notiz über die Zusammensetzung der Harnphenole des Menschen. [The decomposition of tyrosin by *Bacterium coli phenologenes*.] Biochem. Zeitschr. 87: 123-128. 1918.

580. STEWART, ALFRED W. Recent advances in organic chemistry. 3rd ed. 550 p., 1 chart. Longmans, Green and Co.; London. 1918. The third edition of this work exhibits much new material, although only eight years have elapsed since the previous edition. Physiologists interested in the biochemical aspects of the subject will find particularly applicable the extensive treatment of such sections as the following: V. Rubber; VI. The Alkaloids; VII. The Polypeptides; VIII. The Chlorophyll Problem; IX. The Anthocyanins; and X. Some Theories of the Natural Synthesis of Vital Products. The author makes it clear that the book is not intended merely as a compilation of facts, but rather as a work at once critical and suggestive of the directions of research.—B. M. Duggar.

581. WOLF, C. G. L. Contributions to the biochemistry of pathogenic anaerobes. V. The biochemistry of *Vibrio septique*. Jour. Path. and Bact. 22: 115-128. 1918. This organism attacks primarily carbohydrates. Although growing freely in the absence of carbohydrate and producing gas, the addition of carbohydrate greatly accelerates the metabolic process. Its gas-forming capacity it falls within the range of *Bacillus welchii*, but acid production is not so marked as in the latter. The proteolytic action is comparable with that of *B. welchii*. The addition of a small amount of fresh tissue to a medium affording little growth results in stimulating growth activity.—B. M. Duggar.

METABOLISM (NITROGEN)

582. DAVISSON, B. S. Ammonia and nitric nitrogen determinations in soil extracts and physiological solutions. Jour. Indust. and Eng. Chem. 10: 600. 1918. The results show that a modification of the aeration method as employed by Folin in the determination of ammonia is applicable when large volumes of soil extracts and physiological solutions are used. R. W. Webb.

583. HUTCHINSON, H. B. The influence of plant residues on nitrogen fixation and on losses of nitrate in the soil. Jour. Agric. Sci. 9: 92-111. Fig. 1-5. 1918. Experiments give evidence that the nitrogen content of sand or soil may be appreciably increased by the activity of *Azotobacter* when dextrose and saccharose are supplied as a source of energy. Plant residues added to soil cultures gave similar results. In laboratory experiments there was a gain of nearly 6 mg. of N per gram of plant residue, and in pot experiments there was realized a gain of 9 mg. per gram of substance added. Besides this source of energy supply there is also necessary a suitable temperature and a supply of phosphates and calcium carbonate. Under the most favorable circumstances for nitrogen fixation there is, after the addition of the organic materials, a period of activity involving processes adverse to growth, and before these have run to completion it is not advisable that a crop be introduced.—S. M. Zeller.

584. SEN, J. N. The influence of potsherds on nitrification in the Indian alluvium. Jour. Agric. Sci. 9: 32-42. Fig. 1-4. 1918.—The influence of different percentages of potsherds

in soils on the formation of nitrates was studied. Oxygen and nitrates were estimated in the solution which percolated from jar cultures. The nitrates and oxygen were more concentrated in those cultures containing potsherds. In experiments in lysimeters samples of soil were taken from different layers of soil every fortnight and the results are shown graphically. In these cases also an increase in the quantity of potsherds seems to increase the proportion of nitrate.—S. M. Zeller.

585. EULER, HANS. Über Enzyymbildung. [Enzyme formation.] *Biochem. Zeitschr.* 85: 406-417. 1918.—Data are given substantiating the theory that the formation of invertase does not occur through a splitting off or secretion by the protoplast or other cell substances but through a synthesis. The energy liberated through fermentation is essential to this synthesis.—H. Schmitz.

586. EULER, HANS, AND OLOF SVANBERG. Untersuchungen über die chemische Zusammensetzung und Bildung der Enzyme. XV. Neue Messungen an *Bact. acid. lactis* (*Streptococcus lactis*). [The chemical composition and formation of enzymes. New measurements with *Bacterium acid. lactis*.] *Hoppe-Seyler's Zeitschr. Physiol. Chem.* 102: 176-184. *Fig. 1-4*. 1918.

587. HAMMERSTEN, OLOF. Studien über Chymosin- und Pepsinwirkung. IV. Die Wirkung der Enzyme auf Natriumcaseinate. [The action of chymosin and pepsin upon sodium caseinate.] *Hoppe-Seyler's Zeitschr. Physiol. Chem.* 102: 33-77. 1918.

588. HAMMERSTEN, OLOF. Studien über Chymosin- und Pepsinwirkung. V. Wirkung der Enzyme auf Erbsenlegumine. [The action of chymosin and pepsin upon legumin of peas.] *Hoppe-Seyler's Zeitschr. Physiol. Chem.* 102: 105-147. 1918.

589. IVANOV, N. On the nature of the proteolytic enzyme of yeast. *Biochem. Jour.* 12: 106-119. 1918.—The estimation of nitrogen in protein was obtained by the Stutzer method and the quantity of amino-groups by the Van Slyke method. Lebedev's dried yeast and hefanol (a Munich preparation of dried yeast) were used as the sources of enzymes. Acidity produced by monopotassium phosphate considerably increases the rate of decomposition of protein up to the peptone stage. If the temperature is lowered (from 46°C. to 34°C.) peptase action continues so that practically all of the peptone is converted into amino-acids after seven days. At a temperature of 75° peptase action is entirely suppressed, and 19 per cent alcohol similarly destroys the activity of this enzyme. Alkalinity produced by dipotassium phosphate inactivates the protease and activates the peptase.—S. M. Zeller.

590. JACOBY, MARTIN. Über Bakterien-Katalase. [Catalase in bacteria.] *Biochem. Zeitschr.* 89: 350-354. 1918.

591. JACOBY, MARTIN. Über die Einwirkung der Aldehyde auf die Urease. [The action of aldehydes upon urease.] *Biochem. Zeitschr.* 85: 358-364. 1918.—Aldehydes inhibit urease action, probably due to the formation of an aldehyde-enzyme combination.—B. M. Duggar.

592. JACOBY, MARTIN. Über Fermentbildung VI, VII. [Enzyme formation.] *Biochem. Zeitschr.* 88: 35-42. 1918.—See Bot. Absts. 2, Entry 836.

593. JACOBY, MARTIN. Über die Wirkung der Cyanhydrine auf Fermente und Bakterien. [The action of cyanhydrin on ferments and bacteria.] *Biochem. Zeitschr.* 87: 129-134. 1918.

594. LEBEDEV, ALEXANDRE. Sur la fermentation de l'acide glyoxylique. [Fermentation of glyoxylic acid.] *Biochem. Jour.* 12: 81-86. 1918.—Experiments show that the action of yeast on glyoxylic acid is very marked. As far as this acid is concerned, the products of its decomposition, excepting carbon dioxide and acetaldehyde, are an open question. Alcohol

probably a product if there is a simple reduction of acid as in the reaction: $\text{CHO} \cdot \text{CO} \cdot \text{H} + 2\text{H}_2\text{O} + \text{CH}_3\text{CH}_2\text{OH}$. Then acetaldehyde follows as an oxidation product. The ethyl alcohol which is formed anaerobically in plant tissues does not always result from sugar, and among other organic acids glyoxalic acid may have to be added to the probable sources of ethyl alcohol.—S. M. Zeller.

595. LEBEDEV, ALEXANDRE. Sur la formation des éthers phosphorés pendant la fermentation alcoolique. [Formation of phosphoric esters in alcoholic fermentation.] *Biochem. Jour.* 12: 87-92. 1918. Fifty grams of yeast were added to a nutrient solution containing 100 grams saccharose, 35 grams monosodium phosphate, 17 grams disodium phosphate and 1 cc. toluene in 500 grams of water. By preparations of p-bromophenylhydrazine, p-bromophenylosazone, and phenylosazone, it was demonstrated that a mixture of phosphoric esters was produced during fermentation. These esters differ from the hexose-phosphate which the author has discussed in a previous paper. —S. M. Zeller.

596. MEYERHOFF, OTTO. Über das Gärungscoferment im Tierkörper. [The co-ferment of alcoholic fermentation in the animal body.] *Hoppe-Seyler's Zeitschr. Physiol. Chem.* 102: 1-32. 1918.

597. MEYERHOFF, OTTO. Zur Kinetik der zellfreien Gärung. [The kinetics of cell-free alcoholic fermentation.] *Hoppe-Seyler's Zeitschr. Physiol. Chem.* 102: 185-225. Fig. 1-7. 1918. This paper concerns itself with alcoholic fermentation along the general lines developed by Harden and Young. He notes an induction period characteristic of yeast sap after the addition of sugar. At first fermentation shows a strong increase due to the free phosphate contained in the sap; the rise in the velocity of the reaction gradually develops, more slowly the higher is the concentration of phosphate at the beginning. He has also been able to develop a salt action due to phosphates or other salts. When an ester of hexose phosphate is added the rise in the fermentation curve is more rapid, and is not dependent upon the yeast set free. With increase in the co-ferment the fermentation curve rises, and fermentative action corresponds more nearly to the concentration of the co-ferment than to any relation to zymase content. The inhibition of zymase and of hexose phosphate in the sap is similar. On the other hand, in dry yeast the fermentation of the hexose phosphate is inhibited by smaller concentrations, and these lie between those for the sap and those inhibiting action in the living cells.—B. M. Duggar.

ORGANISM AS A WHOLE

598. BÜSGEN, M. Biologische Studien mit *Botrytis cinerea*. [Biological studies of *Botrytis cinerea*.] *Flora* 11-12: 606-620. 1918.

599. KIDD, F., AND C. WEST. Physiological predetermination: the influence of the physiological condition of the seed upon the course of subsequent growth and upon the yield. II. Review of literature. *Ann. Appl. Biol.* 5: 112-138. Fig. 1-2. 1918. A review of the literature on this subject reveals two groups of environmental conditions influencing the seed while on the parent plant. First, the effect of the position of the seed is reflected in the size of the structure, and is independent of external conditions. Second, the environment as affecting the parent plant may, however, influence the course of development of the seeds produced in subsequent generations.—S. M. Zeller.

600. SINNOTT, EDMUND W. Factors determining character and distribution of food reserves in woody plants. *Bot. Gaz.* 66: 162-175. 2 fig. 1918. See Bot. Abstr. 1, Entry 549.

GROWTH AND DEVELOPMENT, REPRODUCTION

601. KLEBS, GEORG. Über die Blütenbildung von *Sempervivum*. [Conditions affecting flower development.] *Festschrift, Stahl. P.* 128-151. Jena, 1918. Klebs divides the process of flower formation by the rosettes of *Sempervivum Funkii* and *S. albidum* into three dis-

tinued successive steps: (1) production of the condition of ripeness to flower (*blühreife Zustände*), (2) formation of flower primordia and (3) development of flower clusters and elongation of the axis. Light is the dominant factor in determining all three of these stages of development. In the first and third, light is effective entirely through its photosynthetic action and its effectiveness rises with its energy value. Higher temperatures counteract this by favoring dissimilation. Accordingly the effect of high temperatures can be in part annulled by increased light intensities. It is the balance of carbon-assimilation over dissimilation that furthers the development of these two stages. Klebs finds that at lower temperatures (about 6°C.) both these stages can be attained in darkness although in the last step gives a far less extensive inflorescence. Klebs thinks this is likewise tied up with a balance in favor of available carbon synthate. The lower temperature gives low respiration and leads to the accumulation of soluble sugars by the hydrolysis of insoluble carbohydrates. In the second step, formation of flower primordia, light has two distinct and antagonistic effects. The one which favors the process is due to the photosynthetic activity of the light and is a function of the less refrangible rays of the spectrum. The other, which inhibits the process or even annuls the ripe to flower condition must at present be termed a stimulus effect and it is a function of the less refrangible blue rays. Diffuse daylight is relatively injurious to primordia development because of the high percentage of blue violet rays it contains. The Osram light and direct sunlight favor this development because of the dominance of the blue rays. Klebs says it is still an unanswered question whether inflorescence development in other forms and in plants in general can be divided into these three distinct steps with similar light effects in each step. He suggests some facts as evidence that such may be the case. Klebs past work has done much to show that the formative effects of conditions on plants is largely through the nutrient effects of these conditions. Thus the formative effect of light is explained in a large part by its effect on carbon-assimilation, but Klebs points out here in his older work that there is also a specific formative action of the blue rays as yet unexplainable on the nutrient basis. —W. Crocker.

602. KNIPE, HANS. Über die Bedingungen der Schnallenbildung bei den Basidiomyceten. [Conditions for beak formation in the Basidiomycetes.] *Flora* 11-12: 330-335. 1918.

603. KÜSTER, ERNST. Über rhythmisches Dickenwachstum. [Rhythmical secondary growth thickening.] *Flora* 11-12: 621-640. 1918.

MOVEMENTS OF GROWTH AND TURGOR CHANGES

604. MÖHMUS, M. Über Orientierungsbewegungen von Knospen, Blüten und Früchten. [Movements of orientation in buds, flowers, and fruits.] *Flora* 11-12: 396-417. 1918.

605. STATOR, A. Some observations on yeast growth. *Biochem. Jour.* 12: 248-258. 1918.—In this paper a method of measuring the logarithmic constant of growth and the generation-time of micro-organisms is described, and the importance of such measurements in an investigation of the growth of these organisms and of the chemical action brought about by them is discussed. —S. M. Zeller.

606. WOKER, GERTRUD. Zur Physik der Zellkernteilung. [The physics of cell division.] *Zeitschr. Allgem. Physiol.* 18: 39-57. Fig. 1-14. 1918.

607. ZOLLIKOFFER, CLARA. Ueber das geotropische Verhalten entstärkter Keimpflanzen und den Abbau der Stärke in Gramineen-koleoptilen. [Statolith starch.] *Ber. Deut. Bot. Ges.* 36: 30-38. 1918.—Miss Zollikofer finds that the statolith starch of seedling organs is relatively readily removed by periods of illumination followed by periods of darkness, but is persistent in organs grown continually in darkness. The persistence of the statolith starch is a function of the degree of etiolation. Thus the writer considers a biological adaptation. By growing seedlings of *Fagates erecta* and seedlings of other Compositae in light one to five

days followed by three to four days of darkness, hypocotyls were obtained that bore no statolith starch. These hypocotyls were still growing and capable of phototropic movement but incapable of geotropic movement. Light rendered them geo-sensitive only after it had produced statolith starch. Working by similar methods the author shows a close relation between the amount of mobile starch and geo-sensitivity in the coleoptile of grasses. *Wm. Crocker.*

GERMINATION, RENEWAL OF ACTIVITY

408. MOORE, W., AND H. K. HAYES. A new matze secret. Jour. Agric. Victoria 16: 121-124. 1918. The fumes of nitrobenzine are reported to increase the rate as well as the percentage of germination. *B. M. Duggar.*

REGENERATION

409. FIGDOR, WILHELM. Zur Kenntnis des Regenerationsvermögens von *Crassula multicaulis* Lem. [Regeneration capacity in *Crassula multicaulis*.] Ber. Deut. Bot. Ges. 36: 241-246. 1918.

410. MAGNUS, WERNER. Wund-Callus und Bakterien-Tumore. [Wound callus and bacterial tumors.] Ber. Deut. Bot. Ges. 36: 20-29. 1918. Polar difference in wound-callus formation has often been observed in stems and less frequently in root structure. Magnus finds that segments of the root of a half long carrot with which he worked produced a wound-callus on the morphologically apical face but not on the basal face. This occurred whether the apical face was oriented upward or downward in the moist chamber. The callus starts at the cambium ring and spreads centripetally. When the apical face is infected with *Bacterium tumefaciens* the callus development is much greater. When the basal face is infected there is a considerable development of tumors on that face and this acts in a correlative way to inhibit the normal tumor development on the apical face. Magnus also worked with a long fodder carrot. While infection in this form increased the callus development on the apical face of the segments tenfold, it induced very little tumor development on the basal face and accordingly showed little correlative effect in inhibiting the normal callus development on the apical face.

Magnus offers evidence for the view that the tumor-inducing organism in plants is not identical with that in man. He also suggests that certain conclusions of Blumenthal and his field on the effect of *Diplococcus* on tumor formation in plants may be wrong because they failed to recognize the polar disposition to callus formation in plants. He thinks the studies on tumor formation in plants will finally throw much light on cancer development. *[See Bot. Absts. 2, Entry 777.] Wm. Crocker.*

LIGHT RELATIONS

411. LEHMANN, ERNST. Ueber die minimal Belichtungszeit welche die Keimung der Samen von *Lythrum salicaria* auslöst. [Minimum illumination interval for the germination of seed of *Lythrum*.] Ber. Deut. Bot. Ges. 36: 157-163. 1918. Lehmann finds that in a germinator at 20° C. 0.1 second's illumination with 750 H. K. is sufficient to cause 50 per cent of the seed of *Lythrum salicaria* to germinate within twenty-four hours, whereas only 6 to 7 per cent germinate in similar condition in darkness and not more than 7 per cent after ten days. *Wm. Crocker.*

412. SHAMEL, A. D. Some effects of shading lemon trees. Monthly Bull. California State Colln. Hort. 7: 441-451. 4 fig. 8 tables. 1918. [See Entry Bot. Absts. 1, Entry 554.]

TOXIC AGENTS

613. KNAFFEL-LENZ, E. VON. *Beitrag zur Theorie der Narkose.* [The theory of narcosis.] Arch. Exp. Path. und Pharm. 84: 66-87. 1 fig. 1918.—It is shown that volatile water-soluble narcotics are absorbed by gelatine gels in the absence of lipoids, and such gels swell as a result. Water-insoluble petroleum ether is not absorbed and therefore produces no swelling. The author concludes, contrary to Traube, that narcotics diminish swelling effects rather than increase such effects. —B. M. Duggar.

614. WEHMER, C. *Leuchtgaswirkung auf Pflanzen, 4. Die Wirkung des Gases auf das Wurzelsystem von Holzpflanzen; Ursache der Gaswirkung.* [The effects of illuminating gas upon plants.] Ber. Deut. Bot. Ges. 36: 140-149. 1918.—Wehmer has studied the effect of passing continuous streams of illuminating gas through the soil bearing potted herbaceous as well as three to seven year old woody plants. There was a great difference in the amount of injury according to the stage of development. In the spring the trees were entirely killed in a relatively short time. This is in general the sort of reaction given by the actively growing herbaceous forms at all times. In late summer and early fall the injury is less marked and is shown mainly by leaf fall, while in the dormant period of winter the trees are very resistant. Where investigated the embryo in the resting seed and the seedling stage proved very sensitive. Cuttings stood in gas-impregnated water showed, with few exceptions, the seasonal variations in sensitiveness similar to the plants rooted in soils. In spite of this the author thinks that injury to parts above the soil is in part a secondary result of root injury. The injury is due to toxic constituents of the gas and not to mere displacement of oxygen by the gas as Sorauer has suggested. The toxic constituents increase or decrease with the conditions that lead to an increase or a decrease in the odor producing materials. The author promises a later paper on the toxic constituents. —Wm. Crocker.

MISCELLANEOUS

615. BRENCHELEY, W. E. *Buried weed seeds.* Jour. Agric. Sci. 9: 1-31. 1918. The viability was tested of weed seeds, which had been buried at various depths for known lengths of time and under known field conditions. The results show how closely the flora derived from such buried seeds is associated with the history of the land, i.e., permanent grassland, devoid of arable weeds; continual close grazing hinders seed production and reduces the number of seeds that become buried. Mowing may allow of the ripening of early species. Permanent grasslands have a distinct buried flora, which is chiefly pasture plants while grassland that has once been arable contains a large number of seeds common to both pasture and arable lands. True arable weed seeds may be found in soil which has been grassed over for at least fifty-eight years. The seeds survive best in the lower layers of soil. —S. M. Zeller.

616. GÖRTZ, OTTO. *Ueber einige durch schmarotzende Cuscuta hervorgerufene Gewebeveränderungen bei Wirtspflanzen.* [Structural changes induced in the host by Cuscuta.] Ber. Deut. Bot. Ges. 36: 62-72. 1918.

617. HUTCHINSON, H. B., AND A. C. THAYSEN. *The non-persistence of bacterio-toxins in the soil.* Jour. Agric. Sci. 9: 43-62. Fig. 1-4. 1918.—Seven soils were examined to ascertain whether partial sterilization effects may be due to the destruction of bacterio-toxins in the soil. Untreated extracts of the soils differed greatly in their suitability for the growth of *Bacillus prodigiosus*. Heating the extracts lowered the bacterial count, while the addition of antiseptics to the extracts was usually more favorable for bacterial growth than the untreated extracts. Additions of peptone to unfavorable extracts rendered them favorable media. Extracts of very poor untreated soils were inoculated with a common soil organism, *B. fluorescens liquefaciens*, and there was no evidence of toxicity of the soil. The value of the extract of an acid heath soil was distinctly increased after heating. By the continued growth of *B. prodigiosus* on a solution an unfavorable medium is obtained, due to diminution of food value and an increase of toxins. This substance is stable to heat and does not resemble the toxins which are alleged to occur in the soil. —S. M. Zeller.

618. KOLKOWITZ, R. Über die Schwefelbakterien-Flora des Solgrabens von Artern. [Sulphur bacterial flora.] Ber. Deut. Bot. Ges. 36: 218-224. 1918.

619. NEGER, F. W. Die Wegsamkeit der Laubblätter für Gase. [Aeration systems of leaves.] Flora 11-12: 152-161. 1918. Neger has earlier spoken of two types of leaves on the basis of the nature of their intercellular systems: heterobasic and homobasic. In a recent article he compares a heterobasic leaf to a house with thousands of rooms lacking communicating doors, and a homobasic leaf to a similar house with communicating doors present and all open. In the first type the intercellular system is divided into many small isolated regions by the smaller veins with the resulting possibility of different air pressure existing in each, while in the second the whole intercellular system of the leaf is connected and therefore the same pressure exists throughout. Most plants with flat leaves have heterobasic leaves and the size of the individual chambers vary considerably. In various species of *Quercus* they run from 1-840 to 1-1400 sq. cm. and in *Syringa vulgaris* from 1-8 to 1-10 sq. cm. In the same species shade leaves have larger chambers than sun leaves. The following trees and shrubs have homobasic leaves: *Eryonius japonica*, *Hexaquifolium*, *Prunus lauro-cerasus*, *Hedera helix*, *Ardisia crispa* and all needle-bearing trees and shrubs. When injured by smoke the homobasic leaves show the injury to the whole leaf due to the gases distributing themselves throughout the whole intercellular system, while the heterobasic leaves show the injury in spots corresponding to individual intercellular chambers. —Wm. Crocker.

620. RODENWALD, H. Der Vegetationsversuch. [Vegetation experiment.] Ber. Deut. Bot. Ges. 36: 199-201. 1918.

621. TREYAN, J. W. The viscosity of blood. Biochem. Jour. 12: 60-71. Fig. 1-4. 1918. As the title suggests, the author describes and discusses a viscosimeter in which stirring of the liquid during the observations is possible. —S. M. Zeller.

622. URSprung, A., and A. Gockel. Ueber Ionisierung der Luft durch Pflanzen. [Ionization of the air by plants.] Ber. Deut. Bot. Ges. 36: 184-192. 1918.

TAXONOMY OF NON-VASCULAR CRYPTOGRAMS

J. R. SCHRAMM, *Editor*

ALGAE

623. POLLOCK, JAMES B. Blue-green algae as agents in the deposition of marl in Michigan lakes. Rept. Michigan Acad. Sci. 20: 247-260. Pl. 16-17. 1918. Marl formation in Michigan lakes is discussed, the agency being various species of Cyanophyceae belonging to the genera *Schizothrix*, *Lyngbya*, *Rivularia*, *Dicathrix*, *Stigonema*, *Gloeocephala*, *Gloeothece*, and various bacteria. The fossil genus *Girvanella* is shown to be probably one of the genera of Cyanophyceae. [See Bot. Absts. 2, Entry 555.] —E. A. Bessey.

FUNGI

624. BEACH, WALTER S. The Fusarium wilt of china aster. Rept. Michigan Acad. Sci. 20: 281-308. Pl. 18-22, fig. 28. 1918. —A detailed study of the wilt of aster and of its causal organism, which is described under the name *Fusarium conglutinans* Wollenweber var. *californicum* var. —E. A. Bessey. —See Bot. Absts. 3, Entry 97.

625. BONAR, LEE. The rusts of the Douglas Lake region. Rept. Michigan Acad. Sci. 20: 277-278. 1918. —A list of forty species of rusts collected in the summer of 1917 in the vicinity of Douglas Lake in Cheboygan and Emmet counties, Michigan, and determined by Professor J. C. Arthur. —E. A. Bessey.

626. GRAVES, ARTHUR HARMOUNT. Some diseases of trees in greater New York. *Mycol.ologia* 11: Pl. 10. 1919.

627. KAUFFMAN, C. H. The Agaricaceae of Michigan. *Michigan Geol. Biol. Survey* Pub. 26 (Biol. Ser. 5). Vol. 1, xxvii + 324 p. Frontispiece and fig. 1-4. 1918. [Volume 2 in press.]—This work is the result of ten years' study by the author on the mushrooms of Michigan. A general introduction on the structure of agarics, distribution, collecting and preserving, etc., is followed by keys to the genera. The genera and species are then taken up under the following sub-family heads: Cantherelleae, Marasmiaceae, Lactariaceae, Hygrophoraceae, and Agaricaceae. For each genus there is a key to the species. The latter are described in great detail and the distribution is stated as far as known. Under each species is given the reference to the original place of publication and to the illustrations of that species. No synonyms are given. The nomenclature follows the Brussels rules of 1910. New species are described in several genera. 884 species are included in the book, not all of which, however, are at present known in Michigan, inasmuch as the known species of the whole northeastern United States have been included in a number of genera, e.g., *Cortinarius*, *Pholiota*, etc. The genus *Coprinus* is monographed by L. H. Pennington. The final chapter, on mushroom poisoning, is by Dr. O. E. Fischer. A rather detailed bibliography follows, including monographs on various genera. A large glossary and index complete the book. Volume 2, containing the plates, is in press. These plates are excellent heliotype reproductions of photographs taken for the most part by the author, the illustrations being life-size.—E. A. Brown.

TAXONOMY OF VASCULAR PLANTS

J. M. GREENMAN, *Editor*

628. BAIRD, VIOLA B. Field notes on Ericaceae of the Tahoe region. *Madroña* 1: 66-68. 1918. Fourteen species of this group are recorded from the Lake Tahoe region of California.—J. M. Greenman.

629. BERGMAN, HERBERT F. *Flora of North Dakota*. Bienn. Rept. Soil & Geol. Survey North Dakota 6: 151-372. [Chapter XII.] 1918.—The present "Flora" includes the flowering plants, ferns, and fern-allies. The arrangement of families is essentially that of the late Professor Bessey. Keys lead to the families, genera, and species enumerated, but no descriptions of species are given. A general account of the botanical expeditions, the main geological and physiographical features, as well as the types of vegetation of the state precede the taxonomic part of the work.—J. M. Greenman.

630. CRAIB, WILLIAM GRANT. *Primulae Novitates Nonnullae*. [Some novelties of *Primula*.] *Notes Roy. Bot. Gard. Edinburgh* 10: 205-210. 1918.—*Primula aequalis* Craib, *P. oreostora* Craib & Cooper, and *P. pauciflora* Watt are described from specimens collected in India as species new to science. *P. erythrocarpa* and *P. platyrrhiza* Craib are described as new species from plants grown in the Royal Botanic Garden of Edinburgh from seeds collected in Bhutan, India.—J. M. Greenman.

631. CRAIB, WILLIAM GRANT. *Gesneracearum Novitates Nonnullae*. [Some novelties of the *Gesneraceae*.] *Notes Roy. Bot. Gard. Edinburgh* 10: 211-219. 1918.—Craib describes the following plants of China as new to science: *Chlamyloboca connata*, *Peranthis minor* gen. et sp. nov., *P. Forrestii*, *P. cordatula*, *Petrocosmea Henryi*, *Tremacron Forrestii* gen. et sp. nov., and *T. Maieri*.—J. M. Greenman.

632. KOORDERS, S. H. *Abbildung und Beschreibung von Rafflesia atjehensis aus Nord-Sumatra*. [Illustration and description of *Rafflesia atjehensis* from North Sumatra.] *Bull. Jard. Bot. Buitenzorg* III, 1: 77-81. Pl. 1-3, Fig A-K. 1918.—The author gives a detailed description of this parasitic species and accompanies the same by an illustration.—J. M. Greenman.

633. KOORDERS, S. H. Notiz über eine neue abbildung von *Rafflesia Hasseltii* Sur. [Notice of a new illustration of *Rafflesia Hasseltii* Sur.] Bull. Jard. Bot. Buitenzorg III, 1: 82-83. Pl. 4. 1918.—Further notes are recorded concerning *Rafflesia Hasseltii* Sur., and a hitherto unpublished illustration of this species is presented.—J. M. Greenman.

634. KOORDERS, S. H. Beitrag zur Kenntniss der flora von Java No. 9. Beschreibung und abbildung von einer neuen art von *Prunus* aus West-Java. [Contribution to the knowledge of the flora of Java No. 9. Description and illustration of a new species of *Prunus* from West Java.] Bull. Jard. Bot. Buitenzorg III, 1: 84-85. Pl. 5. Fig. A-L. 1918. *Prunus pseudononapoda* is described and illustrated as a new species from western Java. J. M. Greenman.

635. KOPS, JAN, F. W. VAN EEDEN, AND L. VUYCK. Flora Batava. Afbeelding en Beschrijving der Nederlandsche Gewassen. [Flora of Holland. Illustrations and descriptions of the plants of Holland.] Parts 392-395. Pl. 1961-1976. Nijhoff, s'Gravenhage. 1918. The present parts contain illustrations and descriptions of several vascular and non-vascular plants. The vascular plants included are: *Rubus apricus* Wimmer, *Thlaspi perfoliatum* L., *Stipa stricta* L., *Oenanthe pimpinelloides* L., *Rubus caesius* L. forma *glandulosus* Focke, and *Polygonum patulum* Bieb.—J. M. Greenman.

636. MERRELL, E. D. Description of a new species of *Pollinia* in Java. Bull. Jard. Bot. Buitenzorg III, 1: 16. 1918.—*Pollinia geminata* is described as a new species from Java. J. M. Greenman.

637. SMITH, W. W. Diagnoses specierum novarum in herbario Horti Regii Botanici Edinburgensis cognitarum (Species asiaticae). [Diagnoses of new species found in the herbarium of the Royal Botanic Garden of Edinburgh (Asiatic Species).] Notes Roy. Bot. Gard. Edinburgh 10: 167-204. July, 1918.—The following new species and varieties are described, and their authorship is attributable to W. W. Smith unless otherwise indicated: *Anaphalis rhododactyla*, *Asystasia silvicola*, *Chirita chlamydata*, *C. Dalzielii*, *C. umbellata*, *Chrysanthemum japonicum*, *C. jugorum* var. *tanacetopsis*, *Daedalacanthus Wardii*, *Dicliptera elegans*, *D. undata*, *Eclipta penduliflora*, *Eranthemum shacleense*, *E. tapingense*, *Helicia annularis*, *H. clivicola*, *H. pallidiflora*, *H. shacleensis*, *H. silvicola*, *H. vestita*, *Homographis flavatilis* Clarke, *Lonicia alboreolata*, *J. microdonta*, *J. Wardii*, *Lanathus scoriarum*, *Lysiothotus Forrestii*, *L. pusillus*, *L. Wardii*, *Pecistrophe yunnanensis*, *Phacellaria ferruginea*, *Phytolacca clarigera*, *Pluchanthus Reesianus*, *Strobilanthes areniculus*, *S. Austini* Clarke, *S. claviculatus* Clarke, *S. Cybus* Clarke, *S. fimbriatus* Nees var. *mannsculcus*, *S. Hancockii* Clarke, *S. haphensis*, *S. homophylloides* Clarke, *S. Lamiu* Clarke, *S. nankingensis*, *S. ocellatus*, *S. pinulorum*, *S. polyanthus* Clarke, *S. psilotachys* Clarke, *S. rufobartus* Clarke, *S. scoriarum*, *S. stramineus*, *S. Wardii*, *Tanacetum elegantulum*, *T. globriusculum*, and *T. oreolum*.—J. M. Greenman.

638. TRELEASE, WILLIAM. Winter Botany. A companion volume to the author's Plant Materials of Decorative Gardening. 10 x 14 cm., N. L. X. 394 p., numerous text fig. Published by the author: Urbana, Ill. 1918.—This little volume deals primarily with trees and shrubs in their winter state. A dichotomous key, based largely on position of leaves, character of leaf-scar, nature of pith, etc., leads the reader to the various genera included of which there are 326 belonging to 93 families. The volume is copiously illustrated with text figures.—J. M. Greenman.

639. VAN LEEUWEN-REYNVAAN, W. AND J. Niederländisch Ost-Indische Gallen. No. 19. Einige gallen aus Java, achter Beitrag. [Dutch East India Galls No. 19. Some galls from Java, eighth contribution.] Bull. Jard. Bot. Buitenzorg III, 1: 17-76. Text fig. 98. 1918.—While this paper is concerned primarily with plant galls of Java, yet there is recorded a good deal of information concerning the plants of Java, which is of interest to the taxonomist as well as the student of plant geography.—J. M. Greenman.

